

General Purpose Standing Committee No. 5

Inquiry into the M5 East Tunnel

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Terms of Reference

- 1) *That General Purpose Standing Committee No. 5, inquire into and report on the M5 East Ventilation Stack, and in particular:*
 - a) *the implementation of the recommendations of the General Purpose Standing Committee No. 5 report on the 2001 Inquiry into the M5 East Ventilation Stack;*
 - b) *health and safety risks for people using the M5 East Tunnel, including fire risk and risk to commercial drivers and tunnel operators;*
 - c) *air quality and health impacts for residents, workers and business around the tunnel stack and tunnel entrances/exits;*
 - d) *adequacy of conditions of approval, air quality and monitoring provisions and enforcement;*
 - e) *viability of different systems for filtration and treatment of tunnel emissions; and*
any other relevant matters.
- 2) *That the Committee present a report by 5 December 2002.*

These terms of reference were self-referred by the Committee on 24 October 2002.

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The Hon Richard Jones MLC Independent *Chair*

Ms Jan Burnswoods Australian Labor Party *Deputy Chair*

The Hon Amanda Fazio MLC Australian Labor Party

The Hon John Jobling MLC Liberal Party

The Hon Malcolm Jones MLC Outdoor Recreation Party

The Hon Peter Primrose MLC Australian Labor Party

The Hon John Ryan MLC Liberal Party

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Chair's Foreword

While it is always a pleasure to table a report at the end of an Inquiry, with this report there is also a note of regret. This is on two counts. Firstly, on personal note, this report is the last one which I will be responsible for as Chair of General Purpose Standing Committee No.5, as I will not be standing again for a seat in the Legislative Council in the forthcoming election. This is the eighteenth report of this Committee in less than four years. This very busy committee has played a proactive role in promoting accountability and transparency through review of controversial areas in the portfolios under its area of responsibility.

Secondly, however, I regret that this Inquiry has proved necessary at all. The Committee has examined the M5 East ventilation stack first in 1999 and then in early 2001. On both occasions the Committee highlighted the problems in locating an unfiltered exhaust single stack in a valley surrounded by residential housing around the ridges of a valley. The Government has ignored the recommendations of the Committee and of local residents to install a filter to reduce the concentration of particulates into the atmosphere, and the tunnel opened in December 2001 without amendment.

The results are what has led to this third Inquiry. Many local residents are reporting medically documented symptoms of illness which are now currently being investigated by a NSW Health study. At the same time the air quality within the tunnel is failing to cope with the larger than expected traffic volumes: already there have been eight exceedances of recommended carbon monoxide levels, concerns expressed as to the impact on motorists who use the tunnel several times in a day, and a greater than expected use of portal emissions. Meanwhile air monitoring and complaints handling mechanisms have been inadequately designed and implemented.

This report highlights developments in understanding the health impacts of smaller sized particulate matter. Although it is becoming increasingly understood that PM 2.5 particles cause more damage to human lungs the larger PM 10, currently only PM 10 is being officially monitored by the RTA. In this report the Committee acknowledges the work being done nationally to create a standard for PM 2.5, and recommends further work on a new standard for PM 1 or smaller particles.

This report records how the debate over the M5 East Tunnel has shifted since there has been the opportunity to observe the tunnel in operation. The need for filtration of particulates to the external air is still very much apparent, but now it has become clear that filtration is urgently needed to improve in tunnel air quality as well. The Committee recommends that in tunnel filtration be installed, as this will address the health concerns of both those affected by external air and the many thousands of daily users of the tunnel. The Committee calls on the government to act to overcome the intransigence of the RTA and agree to its new recommended solution to this issue.

I would like to thank a number of people who contributed to this report. My fellow committee members undertook this inquiry in a constructive and conscientious manner. The transcripts of the two hearings show the depth of understanding and interest of members in the subject matter, particularly in their thorough questioning of agency witnesses.

The Committee secretariat is also to be thanked for their efforts to organise and implement this inquiry. Senior Project Officer John Young wrote this thorough report in a very short time frame, and was responsible for the organisation of the two hearings. I am also appreciative of the efforts of Steven Reynolds as Director who contributed to the report and the organisation of the Inquiry and Ms Ashley

Nguyen who as Committee Officer formatted the report and assisted in the administration of this Inquiry.

The Honourable Richard Jones MLC
Committee Chair

Summary of Recommendations

Recommendation 1 *page 10*

The Committee recommends that PlanningNSW reconsider its refusal to implement Recommendation 1 of the Committee's 2001 Report to amend the *Environmental Planning and Assessment Act 1979* to prevent approval of developments with modifications which have a significant impact upon a different group of citizens to those affected by the initial proposed development, unless those modifications have been exhibited for public comment.

Recommendation 2 *page 26*

The Committee recommends that the Director General of PlanningNSW direct the Roads and Traffic Authority to implement localised monitoring, as specified under approval condition 73/5, as a matter of urgency. The Committee recommends that at a minimum this monitoring should cover those residents who are currently the subject of a NSW Health study following reported health complaints resulting from the operation of the tunnel.

Recommendation 3 *page 47*

The Committee recommends that the NSW Government take action to ensure that conditions of approval for motorway tunnels include the requirement for the Environment Protection Authority to have a direct compliance and enforcement role with respect to pollution.

Recommendation 4 *page 59*

The Committee recommends that the NSW Government adopt a lead role and take a proposal to the National Environment Protection Council to commence the process for the development of a national air quality standard for PM₁.

Recommendation 5 *page 60*

The Committee recommends that the Federal Government undertake an inquiry into the safety and use of MMT as a fuel additive.

Recommendation 6 *page 71*

The Committee recommends that, at least until the conclusion of the NSW Health in-tunnel study, the RTA erect signage to advise motorists that it is recommended that they close their windows and air vents prior to entering the tunnel.

Recommendation 7 *page 74*

The Committee recommends the Environment Protection Authority immediately commence investigation and monitoring of the levels of particulate matter of size PM_{2.5} and below within the M5 East tunnel.

Recommendation 8 *page 74*

The Committee recommends that as a matter of urgency, while national standards are in the process of being developed, the Environment Protection Authority in consultation with NSW Health and PlanningNSW develop guidelines on PM_{2.5} that must be considered when setting conditions of approval for road tunnel construction.

Recommendation 9 *page 77*

The Committee recommends the WorkCover Authority conduct an audit review of the tunnel operators and the Roads and Traffic Authority to confirm compliance with the requirements of the Occupational Health and Safety Act and Regulation and to identify any other action that should be taken to ensure the safety of workers within the tunnel.

Recommendation 10 *page 89*

The Committee recommends that the NSW Government direct the Roads and Traffic Authority to immediately commence the process for calling for tenders for the installation of electrostatic precipitators within the M5 East tunnel.

Recommendation 11 *page 96*

The Committee recommends that the NSW Government, as a high priority, enforce compulsory emission testing as a condition of registration for Sydney-based diesel-engine vehicles.

Recommendation 12 *page 100*

The Committee recommends that the NSW Government immediately implement recommendations 4 and 5 of the Committee's 2001 Report regarding the Property Value Guarantee.

Glossary

Air NEPM	National Environment Protection Measure for Ambient Air Quality
AQCCC	Air Quality Community Consultative Committee
AQMP	Air Quality Management Plan
CFMEU	Construction, Forestry, Mining and Energy Union
DOH	Department of Health
DUAP	Department of Urban Affairs and Planning
EPA	Environment Protection Authority
m³	cubic metre
NEPM	National Environment Protection Measure
NO₂	nitrogen dioxide
NO_x	oxides of nitrogen
PM	particulate matter
PM_{2.5}	particulate matter less than 2.5 micrometres
PM₁₀	particulate matter less than 10 micrometres
PVG	Property Value Guarantee
RAPS	Residents Against Polluting Stacks
RTA	Roads and Traffic Authority
µg	microgram
µg / m³	micrograms per cubic metre

Chapter 1 Introduction

Terms of Reference

- 1.1** On 21 October 2002 the Director of the Legislative Council's General Purpose Standing Committees received correspondence signed by three members of General Purpose Standing Committee No 5 requesting that, in accordance with the procedure set out in paragraph 4 of the Resolution of the House of 13 May 1999 establishing that Committee, a meeting be convened to consider the proposed terms of reference in relation to the M5 East ventilation stack.
- 1.2** At a meeting on 24 October 2002, the Committee resolved to adopt the following terms of reference:
- 1) *That General Purpose Standing Committee No 5 inquire into and report on:*
 - a) *the implementation of the recommendations of the General Purpose Standing Committee No 5 report on the 2001 Inquiry into the M5 East Ventilation Stack;*
 - b) *health and safety risks for people using the M5 East tunnel, including fire risk and risk to commercial drivers and tunnel operators;*
 - c) *air quality and health impacts for residents, workers and businesses around the tunnel stack and tunnel entrances;*
 - d) *adequacy of conditions of approval, air quality and monitoring provisions and enforcement;*
 - e) *viability of different systems for filtration and treatment of tunnel emissions; and any other relevant matters.*
 - 2) *That the Committee present a report by 5 December 2002.*
- 1.3** The reporting date of 5 December 2002 reflected the scheduled final sitting day of Parliament in 2002 at the time of the reference being considered.

Conduct of the inquiry

- 1.4** The Committee resolved, at its meeting on 24 October 2002, to call for submissions in relevant local newspapers as occurred during the previous inquiry into this issue. The Committee placed advertisements in the following newspapers: *St George & Sutherland Shire Leader*, *Canterbury-Bankstown Express*, *Bankstown-Canterbury Torch*, and *Cooks River Valley Times*.
- 1.5** The Committee also wrote to invite submissions from the following Government Departments and organisations: the Roads and Traffic Authority (RTA), PlanningNSW, NSW Health, the Environmental Protection Authority (EPA); CSIRO; Residents Against Polluting Stacks (RAPS); the tunnel operator Baulderstone Hornibrook; local councils in

affected areas; and several experts who had assisted the Committee previously or who were considered to be able to provide useful information on the terms of reference.

- 1.6** The Committee was only able to provide two weeks for submissions to be prepared given the short time frame of the Inquiry, with a closing date of 11 November 2002. Despite this narrow deadline the Committee received 98 submissions from interested individuals and organisations. A list of submissions is contained at Appendix 1.
- 1.7** The Committee held two hearings at Parliament House, Sydney, on 15 November 2002 and 18 November 2002. The witnesses who gave evidence at the hearings included representatives of government departments, community groups, scientific experts in air quality and engineering experts. A list of witnesses who appeared before the Committee is included at Appendix 2. The Committee Chair also wrote to the Minister for Transport and Minister for Roads, inviting him to appear at either of the scheduled hearings.¹
- 1.8** In addition the Committee undertook a site visit on 11 November 2002. This site visit consisted of viewing of the Motorway control room, the tunnel and the ventilation stack accompanied by representatives of the tunnel operator and the RTA; and a tour of local air monitoring sites accompanied by local residents. Details of this site visit are included at Appendix 2.
- 1.9** The Chair's draft report was circulated for discussion on 29 November 2002. The Committee subsequently adopted the report at a meeting on 4 December 2002. Minutes of proceedings relating to this Inquiry are contained at Appendix 5.

Structure of the report

- 1.10** Chapter Two of the report provides brief background information in relation to this Inquiry, including an outline of the events that have occurred since the conclusion of the Committee's 2001 inquiry into the M5 East ventilation stack. The most important event is of course the opening of the tunnel to traffic in December 2001.
- 1.11** Chapter Three discusses the Government's response to, and implementation of, the recommendations contained in the report on the 2001 Inquiry undertaken by this Committee.
- 1.12** Chapter Four discusses the adequacy of the conditions of approval by PlanningNSW in relation to air quality. Issues of monitoring and enforcement are considered, including concerns about the appropriateness of standards being used and the growing awareness of in-tunnel air quality problems. The issue of lane closures and portal emissions is also discussed as is criticism of the complaints system established.
- 1.13** Chapter Five addresses the health and safety risks and impacts of the tunnel since it began operation in December 2001. The reported health complaints of local residents affected by external air pollution is considered as well as the concerns for the effects of the tunnel atmosphere on tunnel users.

¹ Although no written response was received, the Committee secretariat was advised by the Minister's office that he was unavailable on the two days nominated.

- 1.14** Chapter Six briefly examines the issues concerning filtration of the tunnel emissions, which were also dealt with, at length, in the previous two Inquiries.
- 1.15** Chapter Seven looks at other issues which have arisen during the Inquiry, in particular vehicle emissions, the wood fire burner buy-back scheme and continuing resident concerns about the property value guarantee program.

Chapter 2 Background

This is the Committee's third Inquiry and report on the M5 East. The first report was tabled on the 17 December 1999; and the second report was tabled on 23 July 2001. Much of the second report was focussed on the predicted impact of the tunnel ventilation system on local residents, particularly those in close vicinity to the stack, and, to a lesser extent, the impact on tunnel users. It is fair to say that there were opposing views on the efficacy of the ventilation system design.

The M5 East opened for traffic on 9 December 2001, five and a half months after the tabling of the Committee's second report. Once again there are opposing views on the performance of the ventilation system and on the direct impact the ventilation stack and tunnel are having on air quality, local residents and tunnel users. This opposition generally centres on either different interpretations of the same data or on whether or not the current available data is adequate.

Key events since the previous report

- 2.1** The Committee's 2001 report contained a timeline of events up until July 2001. Set out below is a brief outline of key events since the tabling of the Committee's 2001 report.

Legislative Council order for papers

- 2.2** The Legislative Council has made several orders for papers on the M5 East Tunnel under Standing Order 18 since the first inquiry by GPSC 5 in 1999. On 26 June 2002 the Chair of this Committee successfully moved in the house an order for papers for all documents created by the RTA, NSW Health, the EPA, PlanningNSW and central agencies since 28 March 2001.² This was supplemented by a further order for papers on 5 September 2002.³ These papers have been tabled in the Legislative Council and can be inspected by the public, excepting for those documents which the RTA has claimed privilege on commercial grounds.⁴

Court challenge to early opening of the tunnel

- 2.3** The tunnel and stack construction was completed well ahead of the scheduled opening date of 4 June 2002. However when the announcement of the opening was made it was apparent to local residents that some of the conditions of approval made by PlanningNSW were not going to be met by the early opening. These conditions related to air monitoring stations, some of which were not operating. Residents Against Polluting Stacks (RAPS) threatened to seek an injunction in the Land and Environment Court to prevent the opening of the tunnel until all the regulator's conditions had been met or a commitment to

² For the terms of the call for papers see *Minutes of Proceedings of the Legislative Council 26 June 2002* (available through parliament's website at www.parliament.nsw.gov.au).

³ *Minutes of Proceedings of the Legislative Council 5 September 2002* (available through parliament's website).

⁴ *Minutes of Proceedings of the Legislative Council 29 October 2002* (available through parliament's website).

install electrostatic filtration equipment be made.⁵ Three days prior to the opening an agreement was reached between residents and the RTA to avert the temporary injunction.⁶

Agreement between RAPS and RTA

- 2.4** In return for dropping the threatened injunction, RAPS entered into a written agreement with the RTA. The terms of this agreement included that the RTA would increase the amount of fan ventilation for the stack by 10 % to improve dispersal of the exhaust. The RTA also agreed to establish a new committee to monitor air quality, funded by \$100,000 from the RTA and assisted by an air quality expert nominated by the group.

Opening of tunnel

- 2.5** The tunnel opened on 9 December 2001 following an official opening by the Premier. Since that date it has exceeded its predicted traffic volumes but is also achieving its predicted impact of reducing travel times and reducing traffic congestion in the local roads near the tunnel.⁷

Air Quality and Community Liaison Group

- 2.6** As a result of the agreement between RAPS and the RTA to allow the opening of the tunnel a new Air Quality and Community Liaison Group was established to replace the previous Air Quality and Community Consultative Committee. The first meeting occurred on 12 August 2002, and monthly after that date. This Group meeting has become the forum for exchange of information and debate as to the impact of the stack on local air quality, although there have been ongoing disputes as to the effectiveness of this role.⁸

Roads Amendment (Road Tunnel Pollution Filtration) Bill

- 2.7** The object of this Legislative Council initiated Bill is to require particulate matter filtration equipment to be installed and maintained in the M5 East motorway tunnel, the proposed Lane Cove tunnel, and the proposed Cross City Tunnel. A similar bill was introduced in the Legislative Assembly by the Shadow Minister for Roads, John Turner MP.

- 2.8** The Bill was passed by the Legislative Council on the 26 September, but it has not progressed in the Legislative Assembly. During the second reading speech in the Legislative Council the overseas experience of electrostatic precipitators was extensively debated. The debates in both Houses on these bills are available through a search of Hansard on parliament's website at www.parliament.nsw.gov.au.

⁵ "Bad air Day threatens opening of M5 Freeway" *Sydney Morning Herald* 6 November 2001.

⁶ "Nearly tarred and feathered but Scully U-turn averts crisis" *Sydney Morning Herald* 7 December 2001.

⁷ Baulderstone Hornibrook, *Submission No. 73*, p8.

⁸ See for instance RAPS *Submission No. 88*, p23 re RTA refusal to allow Group's funding to be used for health study.

Occupational Health and Safety Act 2000 and Regulation 2001

- 2.9** This amending Act came into effect from 1 September 2001. The Regulation requires employers to identify hazards and to eliminate or control risks at the employer's place of work. Particular control measures are specified with respect to control and monitoring of atmospheric contaminants.

Budget Estimates 2002-2003 hearings

- 2.10** During June 2002 General Purpose Standing Committees held hearings as part of the 2002-2003 Budget Estimates process. GPSC 2 (Health portfolio), GPSC 4 (Transport and Planning portfolios) and GPSC 5 (Environment portfolio) all considered in evidence many issues relevant to the terms of reference for this inquiry. In particular the supplementary hearing held by GPSC 4 on 23 October 2002 dealt exclusively with M5 tunnel issues. The transcript of this and other hearings are available through parliament's website.
- 2.11** A number of questions taken on notice by the Minister for Transport and the Minister for Roads the Hon Carl Scully MP on 23 October 2002 were not answered by the date of this current report being prepared. The questions taken on notice at that hearing appear at Appendix 4, as when the answers are provided they will be highly relevant to aspects of this GPSC 5 inquiry.

Current status of the M5 East project

- 2.12** Currently the tunnel is owned, operated and maintained by Baulderstone Hornibrook Bilfinger Berger joint venture (BHBB) for a period of up to 10 years. For the purposes of traffic management BHBB has entered into a joint venture with French engineering company Egis. The maintenance and operation of the tunnel is governed by a Deed between BHBB and the RTA.
- 2.13** The regulator of the tunnel so far as air quality in tunnel and external is PlanningNSW, as outlined in previous reports. 150 conditions of approval were made in December 1997 when the Minister for Planning approved the project, with 12 specifically directed to the control and management of air quality during the operation stage. These were supplemented by a schedule of eleven additional sub-conditions in August 2000. These conditions appear at Appendix Five. In implementing and monitoring the conditions of approval PlanningNSW acts on advice from NSW Health, the EPA and the RTA.

Benefits of the M5 tunnel

- 2.14** The main body of this report is concerned with problems associated with the opening of the M5 tunnel, as these concerns lead to the establishment of this third Inquiry. However the Committee wishes to acknowledge that there have been some benefits to NSW as a result of the tunnel, particularly to motorists. As argued by the RTA in their submission, there is little doubt that the M5 has contributed to significant reductions in travel times and

congestion on surface roads in southern and south-west Sydney, and improved access to key locations such as Sydney Airport, Port Botany and industrial and commercial areas.⁹

2.15 Some of the benefits to traffic quoted by the RTA in its submission include:

- 7 day average traffic volumes of 82,026 vehicles per day recorded on the new M5 East corridor (significantly above predicted volumes)
- major travel savings times for motorists
- reduced traffic at 85% of intersections on the local road network
- reductions in traffic on surrounding streets such as Stoney Creek Road (33%), Bay Street (31%) Forest Road (24%) and Bexley Road (23%)
- reductions in heavy vehicles using surrounding roads of up to 77%
- reduced use of local streets as busy arterial roads.¹⁰

2.16 The RTA argue this translates into benefits for local residents in terms of less traffic on local streets, less traffic noise, improved traffic safety and a reduction in vehicle emissions in these areas. PlanningNSW argues in its submission that an estimated 4000 to 5000 residents have benefited from significant reductions in traffic on their streets.¹¹

2.17 Despite these benefits to some residents this Inquiry has come about because many other residents in suburbs such as Turella, Bardwell Park, Earlwood and other surrounding areas believe these gains have been at the expense of the health of their families and of their property values. Since the previous report was released, however, there has arisen the added issue of in-tunnel air quality which has the potential for a negative impact on a much greater number of people.

⁹ Roads and Traffic Authority, *Submission No. 85*, p19.

¹⁰ Roads and Traffic Authority, *Submission No. 85*, p18.

¹¹ PlanningNSW, *Submission No. 84*, p10.

Chapter 3 **Implementation of the recommendations of the 2001 Inquiry into the M5 East ventilation stack**

This Chapter discusses the implementation of the fourteen recommendations from General Purpose Standing Committee No 5's earlier *Report on Inquiry into the M5 East Ventilation Stack (2001)*, tabled on 23 July 2001 ('the 2001 report'). Under the resolution of 13 May 1999 establishing General Purpose Standing Committees the Government is not required to provide a response to reports by such committees. The Government did not provide a response to the recommendations of the 2001 report; for that reason the current terms of reference have included seeking reports on the implementation of those earlier recommendations. The information in this chapter has been drawn primarily from the submissions of the relevant government agencies (RTA, EPA, PlanningNSW) and the presentation made by NSW Health at the public hearing of 18 November 2002.

2001 M5 East Inquiry Recommendations

2001 Recommendation 1

The Committee reaffirms Recommendation Five from its 1999 Report and calls on the Government to urgently amend the Environmental Planning and Assessment Act to prevent a determining authority from approving developments with modifications, which have any significant impact upon the environment or which have an impact upon a different group of citizens to those affected by the proposed development, unless those modifications have been exhibited for public comment. The modifications must be subject to adequate public consultation before the proposal is determined.

3.1 PlanningNSW provided the following response in their submission:

PlanningNSW considers that the Act already provides for comprehensive and explicit legal obligations on determining authorities to undertake EIS and public notification/consultation for modifications deemed to have significant impacts on the environment. These obligations can be challenged by any third party before the Land and Environment Court.

The modification undertaken by the RTA to bring about a 3 to 1 stack configuration at Turella was legally challenged in that context by the local community and the Courts ruled in favour of the RTA as having followed the correct procedures.

PlanningNSW does not consider there is any need nor justification for legislative amendments as there are already in place administrative guidelines, namely, "Is an EIS Required?" This document assists determining authorities to determine the level of environmental significance for the proposed activity. These guidelines also

apply to alterations and modifications to such activities and are heavily relied upon in legal proceedings where there are challenges to determinations.¹²

3.2 The Roads and Traffic Authority provided the following response in their submission:

This recommendation concerns the amendment of legislation which relates to environmental assessment processes. As such, it is not a matter which the RTA is in a position to address. The RTA will continue to comply with its environmental assessment obligations under all applicable legislation.¹³

3.3 The EPA submission did not provide any comment on this recommendation.

3.4 The concern of the majority of the Committee in the 2001 inquiry was that local residents affected by the single stack proposal were given no opportunity to comment on this proposal through an Environmental Impact Statement, unlike those residents from different areas who were able to comment and seek change to the original three stack proposal. The Committee's view in this and the 1999 report was that a change to the legislation is required. The response in the submission by PlanningNSW is that it supports the existing administrative arrangements, which denied a second group of residents the opportunity to comment after a first group of residents successfully shifted the impact from their area.

3.5 Again the Committee refers to the dissenting judgement of Fitzgerald JA in the NSW Court of Appeal where the decision was challenged, and its previous two reports and the arguments presented for legislative change.¹⁴ At the very least the Department should consider issuing more specific guidelines dealing specifically with modifications of activities under Part 5 of the Act to avoid this type of situation recurring.¹⁵

Recommendation 1

The Committee recommends that PlanningNSW reconsider its refusal to implement Recommendation 1 of the Committee's 2001 Report to amend the *Environmental Planning and Assessment Act 1979* to prevent approval of developments with modifications which have a significant impact upon a different group of citizens to those affected by the initial proposed development, unless those modifications have been exhibited for public comment.

¹² PlanningNSW, *Submission No. 84*, p6.

¹³ Roads and Traffic Authority, *Submission No. 85*, p3.

¹⁴ Summarised in General Purpose Standing Committee No 5, *Report on inquiry into the M5 East Ventilation Stack (2001)*, Report 11, July 2001 p19

¹⁵ This proposal was suggested, presumably by PlanningNSW, in a draft Government Response dated May 2001 to the 1999 report, which has been made public as a result of one of the order for papers on this issue made by the Legislative Council.

2001 Recommendation 2

The Committee reaffirms Recommendation Six from the 1999 Report and calls on the Department of Health to immediately begin work on an epidemiological study on the health impacts of the M5 East Ventilation Stack upon the surrounding community, to continue for at least five years after the stack comes into operation.

3.6 **The Roads and Traffic Authority** provided the following response in their submission:

This recommendation is specifically addressed to NSW Health and concerns the conduct of an epidemiological study. As such, it is not a matter which the RTA is in a position to address. The RTA would nevertheless co-operate in any study by NSW Health which relates to the M5 East.¹⁶

3.7 **NSW Health** did not advise the Committee of its formal response to this recommendation. However at the hearing held on 18 November 2002 the Chief Medical Officer, Dr Greg Stewart advised that the Department was commencing a health study of local residents:

NSW Health has received complaints from approximately eighty residents of headaches, eye irritation and increased or new asthma that have occurred since the tunnel opened. Representatives of NSW Health have met with residents on several occasions. Following from these meetings it was decided an investigation of these concerns should be undertaken. Initial assessment demonstrated that there has been no significant change in pollutant levels in the vicinity of the tunnel compared to the previous year.

Residents reported significant odour impacts however and officers of NSW Health believe that the health complaints may be odour mediated and we have briefed several specialists in chemical sensitivity, respiratory medicine and epidemiology on this situation. Following several meetings with these specialists, NSW Health has requested a proposal to investigate these complaints to determine if they are related to stack emissions. The time frame for that study will be months, six months would be the shortest but possibly longer than that.¹⁷

3.8 The submission from Residents Against Polluting Stacks (RAPS) argues that the study followed the outcomes of a study of local residents' health complaints funded privately by RAPS and released in July 2002.¹⁸ The Committee welcomes the belated recognition by NSW Health of the need for this and the in-tunnel air quality study (see Chapter Four) following previous opposition to similar proposals by this Committee in earlier reports.¹⁹

¹⁶ Roads and Traffic Authority, *Submission No. 85*, p3.

¹⁷ Stewart, *Evidence*, 18 November 2002, p41.

¹⁸ RAPS, *Submission No. 88*, p23.

¹⁹ General Purpose Standing Committee No 5, *Report on Inquiry into the M5 East Ventilation Stack (2001)*, Report 11, July 2001 p11.

2001 Recommendation 3

The Committee recommends that the RTA fully implement the recommendations contained in the Facilitator's Report: International Workshop on Tunnel Ventilation, including the specific recommendations for:

- *an examination of the potential for emissions testing and further regulation of solid fuel heating on ambient air quality; and*
- *information on the effect of electrostatic precipitators on external air quality to be specifically sought from countries where this technology is used for external environmental purposes, including Japan and South Korea.*

3.9 The Roads and Traffic Authority provided the following response in its submission:

The RTA set out, at considerable length, its response to the recommendations of the RTA International Workshop on Tunnel Ventilation, convened by the RTA in June 2000, in its submission to the 2001 Inquiry dated 24 April 2001.

The outcomes of the RTA's further investigations in relation to ambient air quality in the vicinity of the Ventilation Stack are discussed in Part 3.3 of this submission. The RTA's ongoing investigation of international developments in relation to tunnel emission treatment systems is discussed in part 3.5 of this submission. The RTA's progress in relation to the improvement of ambient air quality in the sub-region around the Ventilation Stack is discussed in relation to recommendation 11 below.²⁰

3.10 This issue is revisited in Chapter Six of this report.

2001 Recommendation 4

The Committee recommends that the Government reconsider the scope of the property value guarantee offer, and include within it, not only the area visually impacted by the stack, but also those areas where air quality will be disproportionately affected. The approach should be clear and transparent and its application systematic. An organisation outside the RTA should be responsible for the determination of this.

2001 Recommendation 5

The Committee recommends that the terms of the stack property value guarantee be reviewed and that a new offer be made in substantially the same terms as the offer to owners of property above the tunnel and around its portals.

²⁰ Roads and Traffic Authority, *Submission No. 85*, p3-4.

2001 Recommendation 6

The Committee recommends that the Government provide a detailed estimation of the costings relating to the Property Value Guarantee.

- 3.11** To each of these recommendations the **Roads and Traffic Authority** provided the following response in its submission:

Recommendation 4 (5 and 6) relates to the M5 East property value guarantees, which were the result of NSW Government policy decisions to assist local residents in maintaining the value of their homes.²¹

- 3.12** The response to this recommendation is discussed in detail in Chapter Seven, in which the Government is asked to reconsider its refusal to implement these recommendations.

2001 Recommendation 7

The Committee recommends that the NSW Government should take a lead role in the work being undertaken by the National Environment Protection Council in the development of a national air quality standard for PM_{2.5}.

- 3.13** **The Environment Protection Authority** provided the following response in its submission:

The Department of Health and the EPA, supported by the RTA have taken a lead role in the National Environment Protection Council's process for the development of a national air quality standard for PM_{2.5}.²²

- 3.14** **The Roads and Traffic Authority** provided the following response in its submission:

This recommendation concerns the role of the NSW Government generally in the consideration by the NEPC of the prospect of establishing a goal for PM_{2.5} in Australia. Such a role is not part of the functions of the RTA and it is therefore not a matter which the RTA is in a position to address.

The RTA is, however, closely monitoring the NEPC's progress in relation to the development of a standard for PM_{2.5}. At the date of preparing this submission, no standard has been established.²³

- 3.15** NSW, like all States, is part of the National Environment Protection Council (NEPC). Action taken to date is available on the NEPC website.²⁴

²¹ Roads and Traffic Authority, *Submission No. 85*, p4.

²² Environment Protection Authority, *Submission No. 87*, p4.

²³ Roads and Traffic Authority, *Submission No. 85*, p4-5.

²⁴ www.ephc.gov.au.

2001 Recommendation 8

The Committee recommends that the protocol that is required to be developed under additional condition of approval 73(4) clarifying the circumstances in which exceedences of air quality goals will require the installation of electrostatic precipitators in the M5 East Ventilation Stack, adopt the standard given in evidence to the Committee by the Director-General of DUAP that any exceedences, regardless of whether they are due to background air quality or the stack itself, will require the installation of ESPs in the stack.

3.16 The Roads and Traffic Authority provided the following response in its submission:

Pursuant to paragraph 73.4 of the Schedule issued by PlanningNSW in August 2000 (the "PlanningNSW 2000 Schedule"), the RTA developed a protocol outlining procedures for deciding how an exceedence of the PM₁₀ goal in the Approval due to the Ventilation Stack will be determined (the "Ventilation Stack Protocol"), in consultation with the AQCCC and the EPA. The Ventilation Stack Protocol was approved by the PlanningNSW Director-General in September 2001.

The Ventilation Stack Protocol relevantly provides that, in determining how an exceedance due to the Ventilation Stack will be determined, certain events unrelated to the operation of the M5 East (known as "*extraordinary events*") will be excluded. If these events were not excluded, determinations about the effects of the Ventilation Stack would be made on the basis of potentially misleading data.

By way of illustration, the only occasions since the opening of the M5 East where monitoring stations around the Ventilation Stack have shown PM₁₀ readings above the Approval goal are:

- During the bushfires over Christmas 2001, when almost the entire Sydney metropolitan area was shrouded in thick smoke and ash from the bushfires; and
- During the severe dust storm in Sydney in October 2002, when dust caused by the drought conditions and high winds carried large amounts of topsoil through the atmosphere in and around the Sydney metropolitan area.

If the Ventilation Stack Protocol did not exclude such events, then decisions under the Approval which are supposed to relate to Ventilation Stack emissions would be made on the basis of natural events totally unconnected with the design or operation of the M5 East. The RTA submits that such decision-making would be unsound and without merit.

The RTA considers that the exclusion of "*extraordinary events*" is also consistent with the context of the 2001 Inquiry Report from which the Committee's recommendation arose. That is, the 2001 Inquiry Report (pages 79-80) indicates that the Committee was concerned not to exclude "*regular*" exceedences of the PM₁₀ goal from decision-making under the Ventilation Stack Protocol, and the

adoption of a list of “*extraordinary events*” will not serve to exclude “*regular*” exceedances, should they ever occur.²⁵

3.17 PlanningNSW provided the following response in its submission:

The statement attributed to the Director-General is generally correct with the proviso that exceedances that emanate from short-term atypical events (such as bushfires, dust-storms etc) are not to be taken into account. This was stated in writing and oral evidence before the inquiry and the agreed Protocol has reflected this position.²⁶

3.18 This issue is discussed in more detail in Chapter Four of this report in consideration of air quality and monitoring.

2001 Recommendation 9

The Committee recommends that an allowance be made to include the emerging PM_{2.5} air quality national standard in the protocol being developed by the RTA, EPA and DUAP.

3.19 PlanningNSW provided the following response in its submission:

A draft National Environment Protection Measure (NEPM) for PM_{2.5} was released by the National Environment Protection Council in October 2002. The NEPM as proposed is being established for reporting purposes only and is therefore inappropriate to be a compliance standard.

The performance standards for the M5 East Stack have been set by the then Minister in accordance with a statutory document. It would not be appropriate for a Protocol to establish a new air quality performance standard when its purpose is to outline the procedures for how an exceedance will be determined under the conditions of approval. Consideration to include PM_{2.5} standards are outside the scope of the approval.

The RTA is monitoring PM_{2.5} at a single GRIMM monitor at station U1 (corner Jackson Place), for data gathering purposes only.²⁷

3.20 The Roads and Traffic Authority provided the following response in its submission:

As noted above in relation to Recommendation 7, a standard for PM_{2.5} has not been established as at the date of preparing this submission. In any event, the purpose of the Ventilation Stack Protocol, as stated in paragraph 73.4 of the PlanningNSW 2000 Schedule, is to authorise procedures for deciding how an exceedance of the PM₁₀ goal in the Approval due to the Ventilation Stack will be

²⁵ Roads and Traffic Authority, *Submission No. 85*, p5-6.

²⁶ PlanningNSW, *Submission No. 84*, p7.

²⁷ PlanningNSW, *Submission No. 84*, p7.

determined. Consequently, paragraph 73.4 of the PlanningNSW 2000 Schedule does not allow for the inclusion of a standard for PM_{2.5}.²⁸

3.21 The Committee's recommendation was that an allowance be made, not that the protocol be included prior to the standard being developed. The Committee hopes the relevant agencies have not dismissed the proposal out of hand given the real progress being made in developing a national standard (see Chapter Four).

2001 Recommendation 10

The Committee further recommends that the EPA investigates and reports on diffuse and point sources of industrial pollution in the Turella region. All scheduled industries should be assessed to ensure they are complying with license requirements for air pollutants. Non-scheduled industries should be targeted to ensure they are adopting best practice in the reduction of air pollutants. The EPA should facilitate industries in the region to move towards cleaner production technologies.

3.22 **The Environment Protection Authority** provided the following response in its submission:

The M5 East Sub-region Air Quality Management Plan included an inventory of PM₁₀ and oxides of nitrogen from all sources in the sub-region including industrial, commercial and domestic sources. The Plan also included a cost-effectiveness assessment of a broad range of strategies to reduce emissions from all sources. The RTA has initiated the implementation of the Plan which includes a woodheater buy-back scheme.

The EPA has reviewed scheduled industries in this sub-region to confirm that licences are complying with their air pollution conditions.

The inventory results can also be used by Councils as the environmental regulator of small and medium industries to target relevant sectors to encourage the adoption of best practice in the reduction of air pollutants. The EPA supports Councils in this role through providing training and resource materials on the implementation of cleaner production approaches.²⁹

3.23 **The Roads and Traffic Authority** provided the following response in its submission:

This recommendation is specifically addressed to the EPA and concerns the conduct of an investigation in relation to industrial pollution in the Turella region. As such, it is not a matter which the RTA is in a position to address. The RTA would nevertheless co-operate in any such investigation by the EPA.

The RTA also notes that:

- Under condition 80 of the Approval, the RTA is participating with PlanningNSW, the EPA, NSW Health and the NSW Department of

²⁸ Roads and Traffic Authority, *Submission No. 85*, p6.

²⁹ Environment Protection Authority, *Submission No. 87*, p4.

Transport, at the RTA's own expense, in investigations into sub-regional air quality and strategies for improving air quality; and

- Under condition 81 of the Approval, the RTA currently sets aside \$5000,000 per annum over a period of five years, towards funding air quality improvement measures arising from the studies to which condition 80 refers.

The RTA also refers to its work in developing a sub-regional air quality management plan in relation to the area around the M5 East (see Recommendation 11 below).³⁰

2001 Recommendation 11

The Committee notes that the Conditions of Approval require the RTA to develop a regional air quality plan, and recommends that the NSW Government consider adopting further additional measures to improve air quality across the Sydney region, with particular emphasis on the regional air shed in which the stack is situated, such as:

- *Application in the Sydney region of the regulatory approaches to solid fuel heaters being adopted in regional areas such as Armidale.*
- *That an immediate start be made (under the new EPA solid fuel heater initiative) to buy back solid fuel heaters that do not meet EPA standards in the Sydney metropolitan area, particularly in areas of Sydney with significant air quality problems during winter months.*
- *The introduction of emission testing for all vehicles in conjunction with registration checks.*
- *The provision of funding to enable the development of technology for the monitoring of emissions of vehicles and the recording of details of vehicles with excessive emissions at particular locations such as the entrances to the M5 East tunnel, through the use of a "pollution camera" (akin to a "speed camera").*

3.24 Roads and Traffic Authority provided the following response in its submission:

This recommendation is addressed to the NSW Government generally and proposes the consideration of measures in relation to the improvement of air quality across the Sydney region. As such, it is not a matter which the RTA is in a position to address. The RTA would nevertheless co-operate in relation to the development and implementation of any such measures.

In relation to the area around the M5 East, however, in accordance with condition 80 of the Approval and paragraph of the PlanningNSW 2000 schedule, the RTA has prepared a Sub-regional Air Quality Management Plan ("the SAQMP"), in consultation with stakeholders such as PlanningNSW, the EPA, NSW Health, the NSW Department of Transport and the AQCCC. The top priority issues in the SAQMP are now being implemented. The first two components of the SAQMP which are being implemented are:

³⁰ Roads and Traffic Authority, *Submission No. 85*, p6-7.

- **a solid fuel heater buy-back scheme in the M5 East sub-region.** Solid fuel heaters are recognised as one of the main contributors to particulate matter in the atmosphere. So far, the RTA has issued over 260 application forms for the buy-back scheme. An RTA funded Co-ordinator at the Southern Sydney Regional Organisation of Councils in the Hurstville Council Chambers was recently appointed to facilitate the future administration of the scheme.
- **a smoky vehicle detection program,** which provides for reporting of offending vehicles to the EPA for enforcement action. So far, over 280 vehicles have been reported to the EPA through this scheme. The RTA is also providing training for local councils in the vicinity of the M5 East, to assist councils in contributing to enforcements with respect to smoky vehicles in their areas.³¹

3.25 In Chapter Seven the Committee considers this matter further.

2001 Recommendation 12

The Committee recommends that filtration equipment be installed in the M5 East Ventilation Stack so as to minimise the additional source of air pollution to the Turrella region.

3.26 **The Roads and Traffic Authority** provided the following response in its submission:

As indicated in Part 3.5 of this [the RTA] submission, the evidence available to the RTA to date indicates that there is no definitive data to support the effectiveness of air treatment systems in improving external air quality in the operational phase of a tunnel. Furthermore, as discussed in Part 3.3(a) of this submission, recent analysis of ambient air quality monitoring data recorded around the Ventilation Stack indicates that ambient air quality around the Ventilation Stack has not decreased since the M5 commenced operation.

In these circumstances, the installation of electrostatic precipitators ("ESPs") or other emission treatment systems cannot be supported at this stage. However, the M5 East Tunnel has been constructed so as to allow for the installation of ESPs and/or other emissions treatment systems, should evidence of their effectiveness in improving external air quality become available and the circumstances exist to justify their installation.³²

3.27 **PlanningNSW** provided the following response in its submission:

PlanningNSW concluded that there was sufficient certainty that a 35 metre high stack would be able to meet the specified air quality goals. Filtration system can only be required if the RTA does not meet the specified goals.

On the balance of evidence it is also expected that background air quality should improve over time. Together with improvements to fuel technology and the implementation of the Air Quality Management Plan this should result in a net

³¹ Roads and Traffic Authority, *Submission No. 85*, p7.

³² Roads and Traffic Authority, *Submission No. 85*, p8.

improvement to local and regional air quality. On this basis the installation of a filtration system does not at this stage appear to be cost effective.

The conditions of approval imposed by PlanningNSW and the Minister are comprehensive and sufficient to address community concerns in this regard. Since the opening of the tunnel in December 2001, the external air quality has been well within the goals specified. Issues on in-tunnel air quality have focused on carbon monoxide. Filtration systems such as electro-static precipitators (ESP) are used to treat particulates, of which there have been no exceedances in the M5 East tunnel.³³

- 3.28** In later chapters the Committee expresses concern as to comments that “goals have been achieved” when it is the goals themselves which have previously been criticised as inadequate. The Committee re-examines the issue of air quality and health impacts on residents in later chapters. A significant change since the 2001 report is the consideration of the importance of electrostatic filtration systems for improving in-tunnel air quality, which was not previously considered to be as significant a problem as external air quality.

2001 Recommendation 13

The Committee recommends that the Roads and Traffic Authority immediately call for tenders for the installation of electrostatic precipitators in the M5 East Ventilation Stack.

- 3.29** **The Roads and Traffic Authority** provided the following response in its submission:

The RTA is required to conform with NSW Government policy in respect of calling for tenders. Given the ambient air quality results in the vicinity of the Ventilation Stack (see Part 3.3(a) of this submission) and the evidence available to the RTA concerning ESPs (see Part 3.5 of this submission), the RTA is unable to call for tenders for the installation of ESPs in the M5 East Tunnel at this stage. Nevertheless, the RTA has updated its assessment of the cost of installing ESPs. This assessment is discussed further in Part 3.5 of [the RTA] submission.³⁴

- 3.30** The Committee further notes that the RTA has to be ready to install within six months of a direction to do so as part of approval condition 73/4 from PlanningNSW.

³³ PlanningNSW, *Submission No. 84*, p7-8.

³⁴ Roads and Traffic Authority, *Submission No. 85*, p8.

2001 Recommendation 14

The Committee recommends that, in view of the increasing number of proposed tunnels in NSW (such as the Cross City tunnel and Lane Cove tunnel) and the concerns expressed by the RTA over the viability of filtration technology in the form of electrostatic precipitators, the M5 East Ventilation Stack be treated as a pilot study of filtration technology in Australia. An independent organisation such as the CSIRO, together with the RTA and other relevant authorities should monitor and report on the effectiveness of this technology and its possible future application in other tunnels in NSW.

3.31 **The Roads and Traffic Authority** provided the following response in its submission:

For the reasons summarised above in relation to Recommendation 12, and expanded in Part 3.5 of this submission, it is not proposed that ESPs be installed in the M5 East Tunnel at this stage.³⁵

3.32 Clearly an opportunity has been lost to use the opening of the tunnel as a pilot for future projects such as the Cross City Tunnel and the Lane Cove Tunnel. During the public hearing the Executive Director, Sustainable Development, PlanningNSW, advised the Committee that, particularly with respect to conditions within the tunnel:

I agree that, irrespective of the conditions and any specific requirements, it is obvious that conditions within that tunnel are not, I suppose, pleasant, in a sense, broadly speaking, relevant to any other tunnel and it is a matter that we have brought consistently to the attention of the RTA and others. We have been following it; we have been asking questions; we have been looking at what can be done to address it. We have been learning a lesson from it in terms of assessing future tunnels and seeing how we can prevent that.³⁶

Conclusion

3.33 The overall government response to the Committee's 2001 Report has been disappointing. Despite minor gains such as the initiation of a NSW Health study into the health impacts for local residents the major recommendations concerning local residents have not been accepted by the NSW Government. The communities affected are still no closer to receiving electrostatic filtration in the tunnel to improve air quality than when the first Inquiry began in 1999.

³⁵ Roads and Traffic Authority, *Submission No. 85*, p8.

³⁶ Haddadd, *Evidence*, 15 November 2002, p52.

Chapter 4 **The adequacy of approval conditions, air quality monitoring provisions, and enforcement**

The M5 East tunnel is subject to 150 conditions of approval set by the Director General of the (then) Department of Urban Affairs and Planning in December 1997. At the previous Inquiry, prior to the opening of the tunnel, the appropriateness of the conditions of approval was debated and the currency of the conditions in terms of reflecting latest scientific research was also challenged.

Now, the ability of the approval conditions to ensure air quality can be viewed within the context of the experience of eleven months of tunnel operation. In this chapter concerns are expressed as to the implementation of the complaints mechanism; carbon monoxide exceedances within the tunnel; local air quality monitoring; and lane closures. The initiation of an in-tunnel study of air quality to be conducted by NSW Health is also noted.

Approval conditions

- 4.1** Twelve of the 150 conditions of approval by PlanningNSW relate to air quality (conditions 70-81). In August 2000 when the 35-metre stack was approved an additional eleven conditions were added. A copy of the relevant conditions of approval is attached at Appendix Five. Planning NSW included in their submission to the Inquiry an attachment entitled: *Current Status of Implementation of Conditions Relating to Air Quality*.
- 4.2** The M5 tunnel is not subject to an EPA license, however, the conditions do allow for the EPA to require action of the proponent with respect to in-tunnel air quality.

Air quality standards for outside the tunnel

- 4.3** The Committee's 2001 report explained the key contributing factors to air pollution and the standards governing air quality.³⁷ Atmospheric pollution is comprised of various substances, including pollutants such as particulate matter such as PM₁₀ and PM_{2.5s} (the numbers refer to the microns diameter of the particles); nitrogen dioxide (NO₂); and carbon monoxide (CO). At present PM₁₀ and CO are the focus of air quality monitoring.
- 4.4** The Acting Director General of the Environment Protection Authority outlined that agencies' involvement in setting the air quality standards for the M5 project:

In terms of the EPA's role through the planning and approval process, the EPA had responsibility to advise on the air quality standards for the key emissions from the tunnel ventilation systems, both the stack and the portals... In advising the relevant standards, the EPA takes account of national standards that are available and, in July 1998, the National Environment Protection Council did provide a

³⁷ General Purpose Standing Committee No 5 *Report on Inquiry into the M5East Ventilation Stack (2001)* Report 11, July 2001, p62-64.

National Environment Protection Measure [NEPM] for ambient air quality. That NEPM, as it is called, has been established for the whole of Australia now and that provides goals, which are required to be met within a 10-year timeframe.³⁸

- 4.5** There has been continuing debate over whether the use of the NEPM standards was appropriate in determining the impact of the ventilation stack, particularly as the NEPM itself advises that NEPM goals are not meant to be used as standards for point sources of pollution. In evidence, the EPA argued that using the 50ppm for PM₁₀ is actually quite stringent:

Mr WOODWARD: The NEPM itself, in the description of the NEPM, says that NEPM goals are ambient goals and are not meant to be used as standards to apply to actual point sources of pollution. You are meant to take those standards into account when assessing point sources to work out strategies to ensure that the ultimate ambient levels are achieved. In that respect the emission levels that were applied to the tunnel were quite stringent.³⁹

- 4.6** However monitoring stations, which aim to monitor airshed concentration levels of pollutants for compliance with air quality guidelines, are located away from an immediate point source. In addition, the application of any standard (whether or not in itself appropriate) is naturally dependent upon the adequacy of the monitoring equipment to capture the data (stack emissions) that is subject to the standard. This issue of monitoring is further discussed later in this Chapter.

- 4.7** The approving and regulatory bodies have all stated they applied the standards that were available to them. However, standards rarely keep pace with advances in medical research and knowledge or technology. The available standard is for PM₁₀. Whether the measure PM₁₀ continues to be a valid measure of vehicle exhaust was questioned by Associate Professor Lidia Morawska of the School of Physical and Chemical Sciences, Queensland University of Technology:

Introduction of modern technologies to engine combustion has led to more efficient combustion, and thus the reduction of large particles that are normally associated with incomplete combustion. These changes, did not, however, result in a decrease in emissions of very small particles, so called ultra fine particles, which are smaller than 0.1 μm . Quite to the contrary, it often led to an increase in the emissions of these small particles, particularly for diesel operated vehicles (unless sulphur level was reduced to very low values, at least below 50 ppm⁴⁰).

In summary, mass of particles emitted by modern vehicles (which is a good measure of large particles) has been decreasing while concentration of small particles, which contribute little to mass, has increased. Therefore, PM₁₀ and even PM_{2.5} are not the best indicators of motor vehicle emissions.

[Studies have shown that] While in the vicinity of roads PM₁₀ and PM_{2.5} concentrations have been shown to be elevated by about 30%; particle number

³⁸ Woodward, *Evidence*, 15 November 2002, p 28.

³⁹ Woodward, *Evidence*, 15 November 2002, p 29.

⁴⁰ This is to apply to road transport diesel fuel from 1 January 2006.

concentrations (the best indicator of ultra fine particles) have been shown to be elevated up to and above to 10 times (dependent upon traffic conditions).

Thus in relation to M5 stack emissions, PM₁₀ measurements are not the best indicator of the magnitude of vehicle exhaust emissions emitted by the stack.⁴¹

- 4.8** The rationale for the application of the standard as a condition of approval was to ensure that the health of the local community did not suffer as a result of the stack. The standard has been met, yet a number of residents have reported a deterioration in their health. This conflict was put to the EPA during the public hearing:

THE Hon. MALCOLM JONES: This Committee has a problem because we are on our third inquiry, driven by the fact people are getting sick, if they are not getting sick then their lives have been severely damaged by the emissions from the stack. Either they are all wrong and your standards and approval mechanism is right; or you are wrong and they are right. What can you say about that?

MR WOODWARD: We are very concerned about this. We have never said anyone is wrong in this process. What we have done is use the standards that are stringent standards by world standards, to apply to this project in the first place. That is based on the best medical and environmental information that is available around the world [in 1998]. We are not more expert to say that is right or wrong. We have used that in good faith, they are the standards applied. In terms of the stack emissions they are being met. People have expressed concern it is impacting on their health. We have met with the residents and so has NSW Health, Planning NSW and others as well and there has been a survey and work going on in terms of trying to identify those impacts people have complained about. I know NSW Health is taking that very seriously and they are doing a study on the impact on health of people around the stack. I think that is the appropriate response Government should take. It is hard to imagine in retrospect you could have any other approach to this.⁴²

- 4.9** The two previous Inquiries both recommended that NSW Health commence an epidemiological study on the health impacts of the M5 East ventilation stack upon the surrounding community. NSW Health advised the Committee that it now will be commencing a study of persons from within the local community. This study is discussed further in Chapter Five.

Air quality complaint mechanism

- 4.10** The approval condition set by PlanningNSW that refers to the handling of complaints was raised during this current Inquiry. Condition 73(5) stipulates:

The RTA shall establish a mechanism regarding the potential for complaints about air quality impacts resulting from the stack. If complaints are received from areas where there is a reasonable potential for localised air quality impacts resulting from the stack, independent local monitoring of PM₁₀ shall be undertaken. Prior to undertaking localised monitoring, the timing and nature of the complaint shall

⁴¹ Morawska, *Submission No 95* p2.

⁴² *Evidence*, 15 November 2002, p34.

be compared with corresponding in-stack (as specified below) and external monitoring to assess whether there is a reasonable correlation with stack emission levels. Any complainant not satisfied with the RTA's response may raise the concern with the Director-General whose decision on the need for monitoring shall be final. Should monitoring of PM₁₀ indicate localised exceedance of the goals as specified in Condition 72, the RTA shall immediately undertake such measures to meet the goals, mitigate the concerns of the resident(s) raising the complaint(s), or retro-fit electro-static precipitators.

- 4.11** The manner of the implementation and reporting of this condition highlights one of the reasons why there is a poor relationship between local residents and the regulating bodies. In its submission (pp 11 and 18) and evidence given to the Committee, PlanningNSW used a careful choice of words to give a less than complete report on the situation. In evidence, the Director-General of PlanningNSW said:

It should be noted that, under condition 73, clause 5 does provide ability for any resident with a legitimate complaint to ask for specific localised air quality monitoring. However, to date, Planning NSW is not aware of any resident requesting or taking up this offer.⁴³

- 4.12** In submission, the Residents Against Polluting Stacks (RAPS) give their perspective on their interaction with government authorities and the response to local complaints. A RAPS public meeting was held on 16 April 2002 at which approximately 200 people attended. Over 70 complaints were documented at the meeting and were sent on to the four relevant government departments with requests for urgent action. The RAPS submission details what then transpired:

Pressure from the EPA resulted in some improvement to the complaint procedure. Eventually some six months after the opening of the tunnel, a well-disguised RTA advertisement [reproduced in the RAPS submission] appeared in local papers, to fulfil the requirement for a complaint procedure. This did not even mention the words complaint or stack.

The complaints line did not operate on the weekends. Residents reported that even when they managed to contact the complaints line, their complaints were dismissed, with the complaints officer suggesting that the perceived impacts might be due to wood burning in the Blue Mountains, the airport, stress, flu injections or hormonal factors. Understandably, many became angry, cynical and stopped reporting their discomfort.

...Almost one-third (21 of the 67) complaints received [by the RTA] over a particular period were discounted because the wind was not considered to be from the direction of the stack, as recorded by the monitoring equipment. The officer used hourly averages rather than five minute wind data, so a wind apparently from the South could actually represent variable winds from East to West.

...Complaints were also discounted on the basis that there had only been one complaint at that particular time, or that the readings from the monitoring stations were not high, despite known limitations of the monitoring equipment in accounting for odours and plume strikes. The officer recommended that only 25 of the 67 complaints be further investigated.

⁴³ Holliday *Evidence*, 15 November 2002, p 48.

To date there has been no attempt to alleviate the discomfort or ill-health experienced by residents, despite clear requirements to do so under Approval Condition 73/5 for local monitoring and mitigating measures.⁴⁴

4.13 Condition 73/5 does not require residents to make formal complaints that request localised monitoring. Rather it states that monitoring by the RTA should occur if the RTA receives complaints from areas where there is a reasonable potential for localised air quality impacts. The condition does provide for a complainant, if they are dissatisfied with the RTA response, to raise their concern with the Director-General of PlanningNSW whose decision on the need for monitoring shall be final.

4.14 The comment from the Director General of NSW Planning that her department was not aware of any resident taking up the 'offer' of localised monitoring is difficult to fathom in light of the above information. It is even more disconcerting in view of the content of documents tabled during the public hearing of the Inquiry.

4.15 On the 27 April 2002 the President of RAPS wrote to the Director General. In that correspondence reference was made to the public meeting of 16 April and the fact that many residents reported health impacts since the opening of the tunnel. Seventy-two signatures collected at the meeting were attached to the correspondence. It went on to state:

Under Approval Condition 73/4 [sic] (August 2000) for the project, your department required the RTA to establish a complaint procedure, whereby additional monitoring would be undertaken in response to complaints, should the in-stack monitoring indicate the possibility of such a complaint being correlated with emission conditions. As yet reliable in-stack data has not been produced for particulate emissions, due to a 'calibration problem'. This is contrary to the requirements of condition 73/7.

Despite several requests from residents and community groups and the Air Quality Consultative Committee, no complaint procedure has yet been publicised. Complainants who have attempted to register concerns with the RTA through the Traffic Incidents line have received ineffectual responses to the effect that the pollution readings from the monitoring stations are within guidelines, and therefore no further action is required.

*We would ask you to immediately direct the RTA to undertake further localised monitoring and to address the complaints of residents.*⁴⁵

4.16 In correspondence dated 13 May 2002, the Director, Major Infrastructure Assessment, PlanningNSW replied in the following terms:

As indicated in Condition 73/5, any localised complaint in the first instance is to be referred to the RTA. I understand that the RTA in consultation with the AQCC has developed a local air quality complaint process. This process is expected to be advertised in local newspapers shortly.

⁴⁴ RAPS, *Submission No. 88*, pp21-22.

⁴⁵ Correspondence dated 27 Apr 02, tabled by Giselle Mawer, 18 November 2002

I note that it would be expected that the comprehensive monitoring network installed around the ventilation stack would pick up more widespread concerns/complaints. To date, the Department has not received any localised complaints.⁴⁶

- 4.17** The selective interpretation of events and choice of words used by PlanningNSW in order for it to be able to state it is not aware of any 'formal request' arising from the complaint process is not helpful to building trust among the community affected by the ventilation system of which PlanningNSW is the regulatory body.
- 4.18** The Committee was advised at its hearing on 18 November 2002 that NSW Health is to undertake a study of local residents to determine whether their health complaints are odour-mediated and related to stack emissions. This study was proposed following NSW Health receiving complaints from approximately eighty residents of headaches, eye irritations and increased or new asthma that have occurred since the tunnel opened. This study is proceeding notwithstanding that initial assessment demonstrated, based on available monitoring data, that there has been no significant change in pollutant levels in the vicinity of the tunnel compared to the previous year⁴⁷.
- 4.19** Given the action being undertaken by NSW Health, it is now reasonable to assume that there exists "a reasonable potential for localised air quality impacts resulting from the stack" as specified under approval condition 73/5. Localised monitoring should be implemented. The results of such monitoring would no doubt be of some value to the study being undertaken by NSW Health.

Recommendation 2

The Committee recommends that the Director General of PlanningNSW direct the Roads and Traffic Authority to implement localised monitoring, as specified under approval condition 73/5, as a matter of urgency. The Committee recommends that at a minimum this monitoring should cover those residents who are currently the subject of a NSW Health study following reported health complaints resulting from the operation of the tunnel.

Condition of approval for CO exposure

- 4.20** Approval Condition 70 sets the carbon monoxide level for the operation stage of the tunnel. Dr Gregory Stewart, Chief Health Officer, NSW Health outlined that department's involvement in setting the condition:

NSW Health, in consultation with the New South Wales EPA, provided advice that the air quality in the tunnel should comply with the [World Health Organisation] WHO 15 minute guideline. This was set in a condition to the effect that the tunnel should be designed and operated so that the WHO 15 minute

⁴⁶ Correspondence dated 13/5/02, tabled by Giselle Mawer, 18 November 2002

⁴⁷ Stewart *Evidence*, 18 November 2002, p 43.

carbon monoxide goal of 87 parts per million, the level on the previous slide, is not exceeded under any conditions.⁴⁸

4.21 The submission from the Environment Protection Authority outlines the subsequent interpretation of the World Health Organisation [WHO] standard that was agreed upon:

RTA has highlighted that it is appropriate that the assessment of any exceedance take account of the *actual levels of carbon monoxide that any individual motorist is exposed to – that is the actual impact of the incident.* [emphasis added]. NSW Health, Planning NSW and the EPA have agreed that such an analysis is relevant to the assessment of an appropriate response to an exceedance as this is consistent with the intent of the condition that no tunnel user would be exposed to a carbon monoxide concentration in excess of 87ppm as a 15-minute average.⁴⁹

4.22 For the purposes of compliance, an *exceedance* is when the carbon monoxide concentration is recorded above 87ppm for fifteen minutes or more, and a *breach* occurs when it can be shown that a motorist was in the tunnel for fifteen minutes during that period of exceedance. This matter was raised during at the public hearing:

The Hon JOHN RYAN: The current standard that has been determined by PlanningNSW with regard to carbon monoxide within the tunnel, I understand the WHO standard that has been discussed relates to the possibility of anyone being exposed for a greater period than fifteen minutes. That has now been interpreted to the actuality of whether someone has been exposed.

...Normally you would measure that standard by having a monitor and saying: Look the monitor has registered a reading over that point, therefore the possibility exists someone could have been there for fifteen minutes.

Whilst I accept the bulk of traffic flows through the tunnel there are plenty of circumstances where people would be exposed to that air quality for greater than fifteen minutes... It is obviously a higher standard to prove someone has actually been exposed.

4.23 In response the EPA argued that in part the new interpretation was a more conservative approach:

Mr WOODWARD: I agree with the possibilities you are raising, but I think we have addressed that to the extent of having a more conservative approach at the current time of having the reference be to an exceedance measured at any one of the stations, regardless of the fact people are moving through the tunnel. The approach we have taken to date has been quite conservative because it takes up those possibilities. In fact in terms of looking at the exposure of people in the tunnel on each of those occasions when there has been an exceedance measured at any particular monitoring station, nobody has been exposed to carbon monoxide - sorry, no motorist has been..⁵⁰

⁴⁸ Stewart *Evidence*, 18 November 2002, p 40.

⁴⁹ Environment Protection Authority, *Submission No. 87*, p5.

⁵⁰ Woodward *Evidence*, 15 November 2002, p 36.

4.24 However the EPA did indicate the current uncertainty of being able to determine the new actuality standard:

Mr WOODWARD: What has been recognised is that a better measure would be trying to relate any person's exposure to carbon monoxide and that means you actually start to have to work out the speed of people travelling through the tunnel and the exposure of monitors and there *is some work going on to see if that can be determined* [emphasis added].⁵¹

4.25 It has been widely noted that there has been eight reported incidents when the in-tunnel carbon monoxide concentration exceeded the 15 minute average. One of those incidents is known to be a definite breach.⁵²

4.26 Given the position that any assessment of an exceedance should take account of the *actual* CO exposure level of any individual motorist, it is interesting to note the responses of both the EPA and PlanningNSW submission to the Inquiry:

At this stage, there is *reasonable* evidence to *support a case that it is unlikely* that any motorist would have been exposed to CO levels above 87ppm....the fact that on the day of a major accident the average speed inside the tunnel was still around 10 km/hr provides a *reasonable level of assurance*.⁵³

For each incident the goal was exceeded at only one [sic] monitor location in the tunnel and consequently the total carbon monoxide exposure of any individual motorist was *most likely well within the goal*.⁵⁴

4.27 The dates and duration of the eight exceedances were:

- Tuesday 5 March: two incidents of 75 and 15 minutes
- Wednesday 6 March: 135 minutes.
- Friday 19 April: 30 minutes.
- Friday 24 May: 15 minutes.
- Monday 27 May: 45 minutes.
- Tuesday 28 May: 60 minutes.
- Wednesday 5 July: 30 minutes (minimum)
- Thursday 22 August: 60 minutes (minimum).

⁵¹ *ibid.*

⁵² Confirmed in a recent GPSC 4 Budget Estimates hearing: Hon C Scully MP, *Evidence* 23 October 2002.

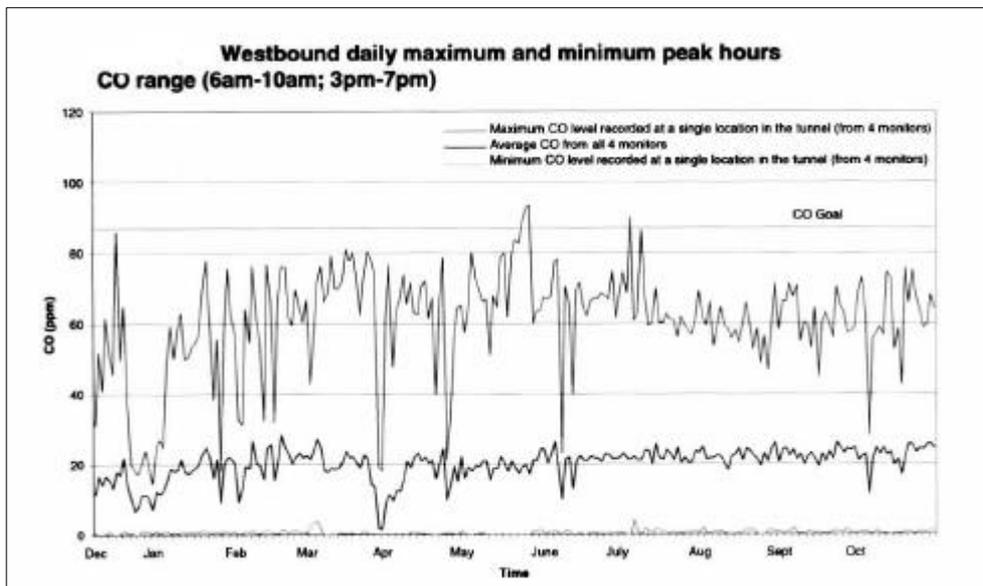
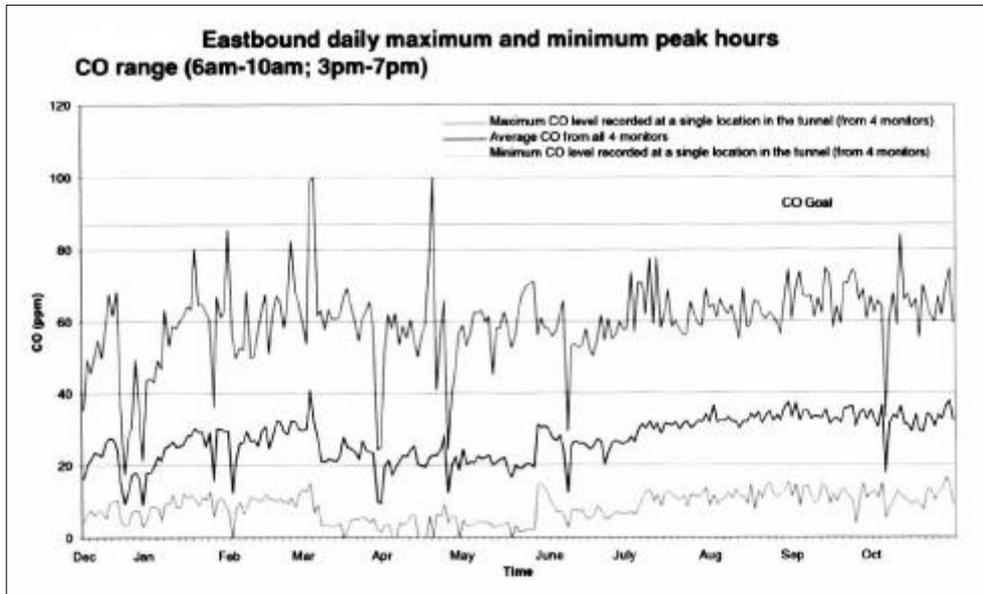
⁵³ PlanningNSW, *Submission No 84*, p12.

⁵⁴ Environment Protection Authority, *Submission No 87*, p5.

4.28

Seven of the reported incidents were of 30 minutes or more duration. The WHO guidelines set a goal of 50ppm for 30 minutes and 13ppm for excess of one hour. However, at present only the 15 minute goal applies as a condition of approval.

Figure 4.1: Tunnel daily CO maximum and minimum levels



Source: *Baulderstone Hornibrook Submission*

4.29

PlanningNSW advised the Committee that the eight exceedances of the CO 15 minute goal were a major issue of concern, and that action had been taken by PlanningNSW in response to these incidents:

Ms HOLLIDAY: PlanningNSW together with the RTA, the EPA and NSW Health have been investigating these incidents. PlanningNSW has written to the RTA requiring a number of actions to be adopted as a matter of urgency to address the in-tunnel problems. We have raised with them appropriate

monitoring of exposure times, strengthening reliability of instrumentation, additional CO monitors inside the tunnel, improved reporting procedures for in-tunnel conditions, strengthening of reporting requirements of peak exposure levels and, for occasions of long periods spent in-tunnel, monitoring of portal emissions and strengthening of traffic management measures during incidents in the tunnel.

We are advised RTA is working through those issues and has undertaken a number of steps already. These include the appointment of a new General Manager on the contractor's management team, additional training for control room and road patrol staff, installation of traffic signals at the tunnel portals and the phasing of Marsh Street traffic signals to minimise congestion in the tunnel particularly during incidents, a revised ventilation protocol to improve air circulation and lower threshold response triggers and a review of the incident response procedures and associated operational and procedural changes.⁵⁵

4.30 It is apparent that, with the heavy volume of traffic and the frequent occurrence of incidents, maintaining the CO levels to acceptable levels within the tunnel is a significant management task. The Committee notes that the tunnel operators and PlanningNSW admit to experiencing teething problems and that improvements have been implemented.

4.31 Notwithstanding the debate on the interpretation of the WHO 15 minute goal and the distinction between exceedance and breach, the success of the management of the tunnel and the recently reported improvements will still be judged on the number of exceedances and the ability to maintain the free flow of traffic.

Tunnel or lane closures due to air quality

4.32 There has been much controversy as to whether or not the tunnel operators are deliberately closing traffic lanes in the tunnel in order to manage air quality. These claims are often based on departmental documents that have been made public as a result of orders for papers by the Legislative Council (see Chapter Two). The opposing claims centre around interpretation and context. Reference was made during the public hearing to one such RTA briefing document:⁵⁶

Lane closures to maintain air quality goals are becoming an increasingly common, almost daily, event for periods of 15-30 minutes during both AM and PM peaks. Lane closures have a substantial impact on network efficiency and road user costs.

4.33 This issue was raised with the Director General of PlanningNSW during the public hearing:

The Hon. JOHN JOBLING: I have heard a number of anecdotal claims about certain things happening and directions for closure of the tunnel. Ms Holliday, can you deal with directions of closure of the tunnel that have been given to the RTA?

⁵⁵ Holliday *Evidence*, 15 November 2002, p 45.

⁵⁶ Correspondence, undated, tabled by Giselle Mawer, 18 November 2002.

Ms HOLLIDAY: No. I indicated in the submission the media have claimed we have in some way asked the RTA to close lanes or close the tunnel, which is incorrect. There has been no direction by us to the RTA to close lanes or to close the tunnel at any time on the basis on in-tunnel air quality.

The Hon JOHN JOBLING: Under condition 70, from an instruction dated 19 June from Simon Schubach, Acting Executive Director, Planning NSW, to Mr Gallacher, Motorways Tunnel Authority it is stated:

However it has been expressed to you on previous occasions there continues to be a serious concern with respect to poor response time. Whilst I note the corrective actions proposed I consider these need addressing as follows:

- (1) *Automotive readings...*
- (2) *Undertaking appropriate steps...*
- (3) *Until otherwise advised implement effective traffic management measures including closing the tunnel and/or on-ramps within fifteen minutes of any single monitoring station recording CO levels inside the tunnel above 87pp.*

Is that not in fact a direction as opposed to your saying there was no such direction?

Ms HOLLIDAY: No it is not a direction, it is a letter to the tunnel operators with regard, as I mentioned, to certain incidents and we were writing to them indicating the seriousness with which we took their management of the tunnel. There is a condition relating to 87ppm over a period of 15 minutes. We are saying we wish them to improve their management operations of the tunnel and that in the event of accidents they need to do everything necessary in order to ensure people were not within the tunnel for longer than fifteen minutes.

The Hon JOHN JOBLING: I will read a little further:

This requirement must be implemented within three months of the date of this letter. Any alternative to closure of the tunnel and/or on-ramps must be supported by detailed assessment confirming the effectiveness and the ability to meet the timeframe as shown below.

Is that not a direction “this requirement must be implemented”? Clearly Mr Schubach, in a letter to Mr Gallacher dated 19 June, has given a direction 100 percent in contravention to the information you have given this Committee. I table a copy of the letter.

...

Ms HOLLIDAY: I interpret “direction” differently to you. Both those letters address circumstances where we are giving the administration of the tunnel very clear indications as to what to do.

...

To improve their operational management of the tunnel in circumstances where they form a judgment that condition No 70, which relates to fifteen minutes at

87ppm, is likely to be breached. I have given them certain options, including at that point closing a lane or the tunnel in order to get people inside the tunnel out within that period. That does not constitute a direction to me. If that constitutes a direction to Mr Jobling I accept his interpretation of that letter; but that does not constitute a direction to me...

The Hon JOHN JOBLING: If you directed them to do it, in my understanding of the English language – and I apologise if my understanding of the language is poor – it is clearly a direction that you have instructed them to do something. There are no ifs, no buts, and no maybes; within three months it must happen. It was followed up by a further letter from Mr Haddad in September that made the matter, in my mind, perfectly clear. Therefore, I would put to you that what a reasonable person – and it is quite recognised in the normal bureaucracy and in the legal terminology – would deduce from those letters is that it is quite clear that you have directed them to do something.⁵⁷

4.34 Mr David Tucker, the Operations and Maintenance Manager, M5 East confirmed to the Committee that no direction or request to the tunnel operators to operate a lane shutting program as a means of reducing pollution in the tunnel, had been made by the RTA, EPA or any other body.⁵⁸

4.35 The perception of tunnel users that lanes are closed solely for air quality issues is often based on there being no visible incident, such as an accident or a maintenance crew, within the tunnel. This was put to the CEO of the Roads and Traffic Authority:

Mr Ryan, we have not given any direction to Baulderstone Hornibrook Egis to close the tunnel to manage air quality. We have asked them to manage the traffic flow in the tunnel in order to address any incident that will occur either in the tunnel, outside the tunnel or in the surrounding road network whereby the traffic flow in the tunnel will affect that incident. I cannot be any clearer in response to you.⁵⁹

4.36 This issue was also canvassed in questions put on notice to the Roads and Traffic Authority and explained in the Authority's response that was received on 3 December 2002:

Q: The tabled documents include a number of references to a procedure for responding to 'incidents' in the tunnel with various traffic management strategies, which appear to range from various levels including reduced speed limits, lane closures and 'closing down a tube'. I draw your particular attention to a procedure referred in the documents tabled as 'Incident Plan for Tunnel Degraded Air (PR – IMP – 007). What is the status of these plans?

A: *The procedures are part of the Contractor's Incident Response Plans for the project.*

Q: How did they come to be drafted?

⁵⁷ Evidence, 15 November 2002, pp 52-53.

⁵⁸ Evidence, 18 November 2002, p 9.

⁵⁹ Evidence, 18 November 2002, pp 17-18.

A: *These plans are part of the Emergency Planning required by Condition 130 of the M5 East Conditions of Approval.*

Q: How frequently have they been implemented at their various levels?

A: *Some details in this regard are given in Baulderstone Hornibrook's submission to the November 2002 Inquiry under the heading 'Minimal Incidents and Impact on Motorists'.*

The Contractor BHBB provides this data to RTA each quarter in a report marked as 'Commercial in Confidence'. In his report dated 25 October 2002 in relation to documents lodged with the Legislative Council during September 2002, Sir Laurence Street upheld the privileged nature of this information in accordance with schedule 3 of the Premier's memorandum 2000-11.⁶⁰

- 4.37** During the public hearing among the documents tabled to the Committee included some July 2002 BHBB internal documents titled "M5 East Incident Report".⁶¹ The nominated Incident type was either "Degraded Tunnel Air Quality" or "Traffic Congestion. The incident forms note that lanes were either closed or attempts were made to close. While acknowledging that forms can be poorly designed with misleading category titles, it is understandable that perusal of the above forms would lead some to conclude that lanes were being closed to maintain air quality.
- 4.38** There is a significant volume of documentation that is open to the interpretation that lane closures are implemented solely to maintain air quality within the tunnel. The Committee notes however that various public officers were asked under oath whether directions had been given with respect to lane closures and those officers answered that they had not. The Committee accords these officers the same credence as it does to the local residents who appeared before them and on oath related the ill-effects the ventilation stack has had on their health (see Chapter Five).
- 4.39** This matter of lane closures has been pursued for some time by opponents of the tunnel. They seek an admission that design is not meeting demand. If lanes do have to be closed to ensure that air quality is maintained at a safe level then obviously that should occur. If at any time the tunnel is not safe then it should be closed to the public until such time as it is.
- 4.40** Ultimately, the tunnel will be judged on its ongoing operational efficiency in terms of its Deed which provides that the operator has an obligation to ensure the Motorway is at all times open to the public for the safe continuous and efficient passage of vehicles. However if lane closures become a means of managing air quality it is surely an admission that alternatives such as filtration need to be pursued.

⁶⁰ Roads and Traffic Authority response to questions on notice, correspondence dated 3 December 2002

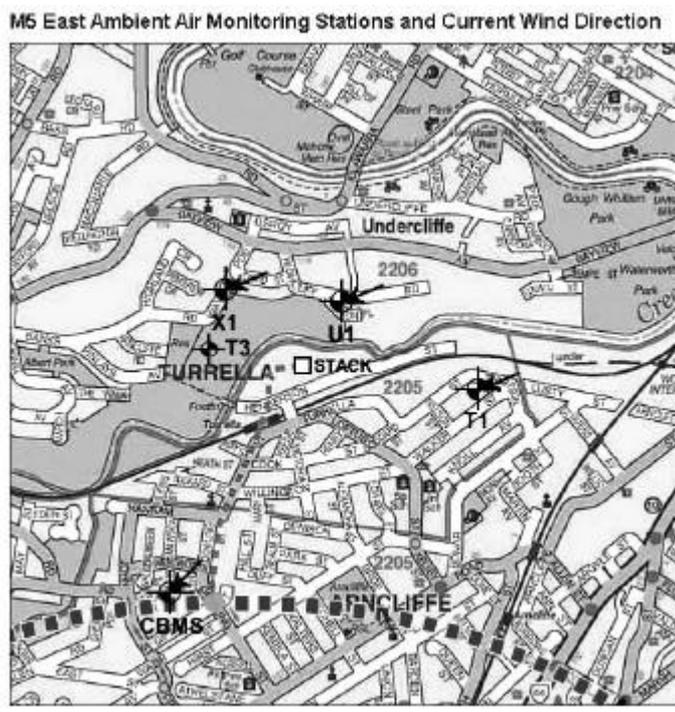
⁶¹ Tabled by Giselle Mawer, 18 November 2002.

Monitoring

Local air quality

- 4.41** Condition 72 of PlanningNSW conditions of approval requires that stack emissions do not result in ambient air quality at ground level exceeding:
- NO₂ – one hourly average of 256 ug/m³ (0.125ppm)
 - PM₁₀ – 24-hour average of 50 ug/m³.
- 4.42** These as well as carbon monoxide are measured at the four monitoring sites which are located at:
- T1 – Cnr Walker Street and Thompson Street, Turella.
 - U1 – Cnr Jackson Place and Highcliff Road, Undercliffe.
 - X1 – Cnr Wavell Parade and David Street, Earlwood.
 - CBMS – Gipps Street Lookout, Bardwell Valley.

Figure 4.2: Location of air monitoring sites



Source: www.rta.nsw.gov.au

4.43 All four stations are equipped with a TEOM (tapered element oscillating microbalance – weighing device) that is used for monitoring the PM₁₀. U1 and T1 also have High Volume Samplers – which take samples for one 24-hour period every six days. These are available for comparison purposes with the TEOM. A GRIMM instrument, which is capable of measuring PM_{2.5}, is included at U1.

4.44 There has been significant debate on whether the monitoring stations can adequately provide information on the level of impact of the ventilation stack on the surrounding population. The concerns raised include:

- The monitoring stations do not measure the most significant exhaust pollutants in terms of health impacts.
- The monitoring stations cannot capture all plume strikes.
- Inappropriate averaging techniques mask the direct impact of the stack.

4.45 During the public hearings the Committee heard evidence from a number of witnesses including air quality scientists on the output of the monitoring stations. The interpretation of those results varied. The only point that was agreed among all witnesses was that at present it is impossible to determine the exact impact the ventilation stack is having upon the local air quality.

4.46 The Committee is not in a position to judge what is the most valid interpretation of the monitoring output. However, a number of issues were raised in submission and during the public hearings, and these are discussed below.

4.47 Dr Kerry Holmes of Holmes Air Sciences has been involved with the M5 project for some time including the first environmental assessment on the ventilation stack. Dr Holmes is part of the air quality group that was set up to look at air quality issues. Dr Holmes provided a presentation to the Committee on her submission on the post and pre air quality conditions:

The questions that we asked in that study were: Have the maximum short term concentrations of any of the monitored emissions changed significantly since the tunnel opened and have the long-term average concentrations changed? We also focused on periods when the wind was blowing from the ventilation stack to the monitoring sites to see whether it was possible to detect the presence of emissions from the ventilation stack above the existing concentrations. We did this to increase the sensitivity of our studies.⁶²

4.48 The general conclusion of the Holmes report was that there had been no significant change in the air quality since the opening of the tunnel. A number of government agencies made reference to the Holmes report in submission to the Committee. The question of whether data could be interpreted as indicative of a significant decrease in NO_x in the area immediately around the stack was raised with Dr Holmes:

Yes, it is more complicated than that. It has a high standard deviation, so in terms of statistics it would not stack up. It is an observation and you are looking

⁶² Holmes *Evidence*, 18 November 2002, p 50.

at data which is highly variable... If it is a consistent trend and it keeps showing up in all the data, then I think after one or two years you could be more confident of that.⁶³

4.49 The presentation by Dr Holmes drew on the results from two of the monitoring stations, namely, U1 and T1. Dr Holmes explained these were the only two of the sites able to provide pre and post stack-opening data. During the public hearing Dr Holmes was questioned on the fact that it appeared the prevailing winds placed the ventilation stack downwind of these monitoring sites; and that this would not be ideal for the purposes of drawing conclusions regarding the impact of the stack:

The Hon. MALCOLM JONES: If the prevailing wind is coming from a direction which is from the same area where the monitoring stations are, would that not be counter-productive or would it not be better to perhaps take T3 and T1, one either side?

Dr HOLMES: T3 is a monitoring station which only has air toxics measured at it. So that is measured on a 24 hour basis. So we do not have the sort of time result data that we have here. What we have here is an opportunity to examine the air quality levels before and after the stack commenced operation. We do not have that opportunity with any of the other monitoring sites. However, I would say that we have actually looked at a correlation between the monitoring that was carried out at X1, which is the other station on the ridge, and U1 which is to the north of the stack, and X1 is to the west of the stack, and we have got a very good correlation between the one hour PM10 data at those sites.

The Hon MALCOLM JONES: In the presentation that you have submitted today, would it not be better to look at a comparison between X1 and T1?

...

Dr HOLMES: Yes, I understand what you are saying, what is upwind and downwind of it, but the point I made is that there is a very good correlation between the two sites on the ridge.⁶⁴

4.50 The position of the RAPS on the monitoring system was put to the Committee:

The thing that alarms me most of all is the constant suggestion that, because the monitoring data does not show anything, there is nothing to show, and here is all this illness and discomfort, the coughing and the wheezing, the headaches and the sore eyes - all imaginary. That is the implication. The logical conclusion is actually that the tool that was expected to provide the information and to truly monitor such possible impacts has been proven to be incapable of doing such a task.⁶⁵

4.51 Mr Curran from RAPS provided the Committee with an interpretation of some data from the monitoring stations which highlighted the level of pollution that was found to be within 24-hour average limits at the monitoring stations:

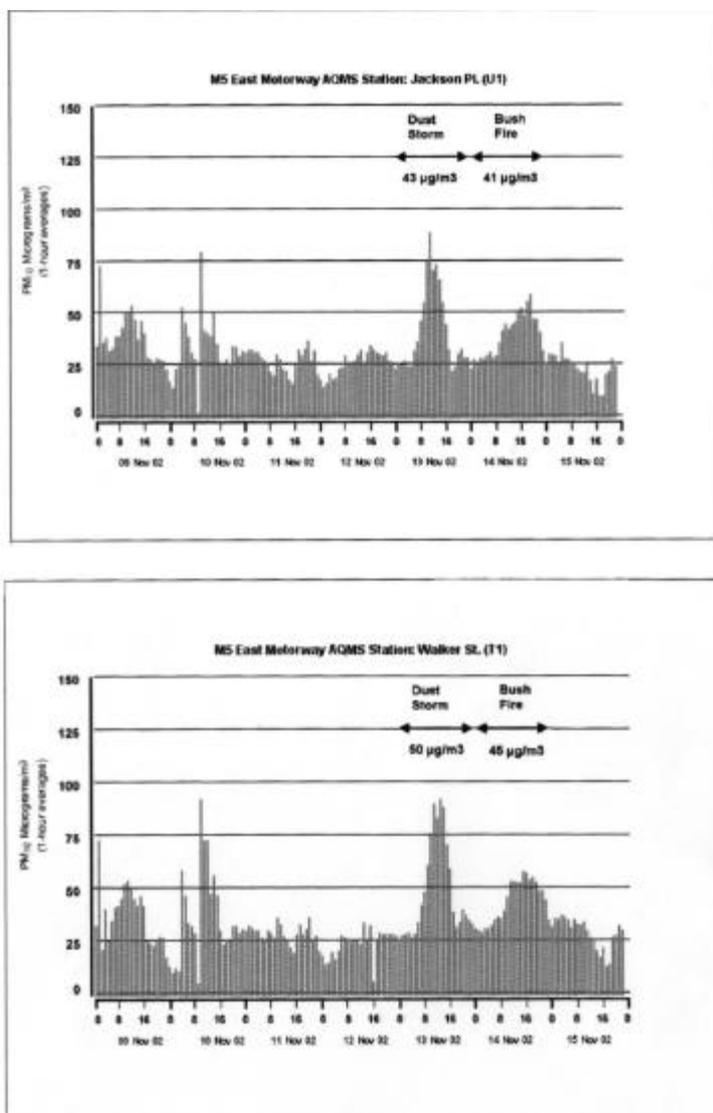
⁶³ Holmes, *Evidence*, 18 November 2002, p 55.

⁶⁴ *Evidence*, 18 November 2002, p54.

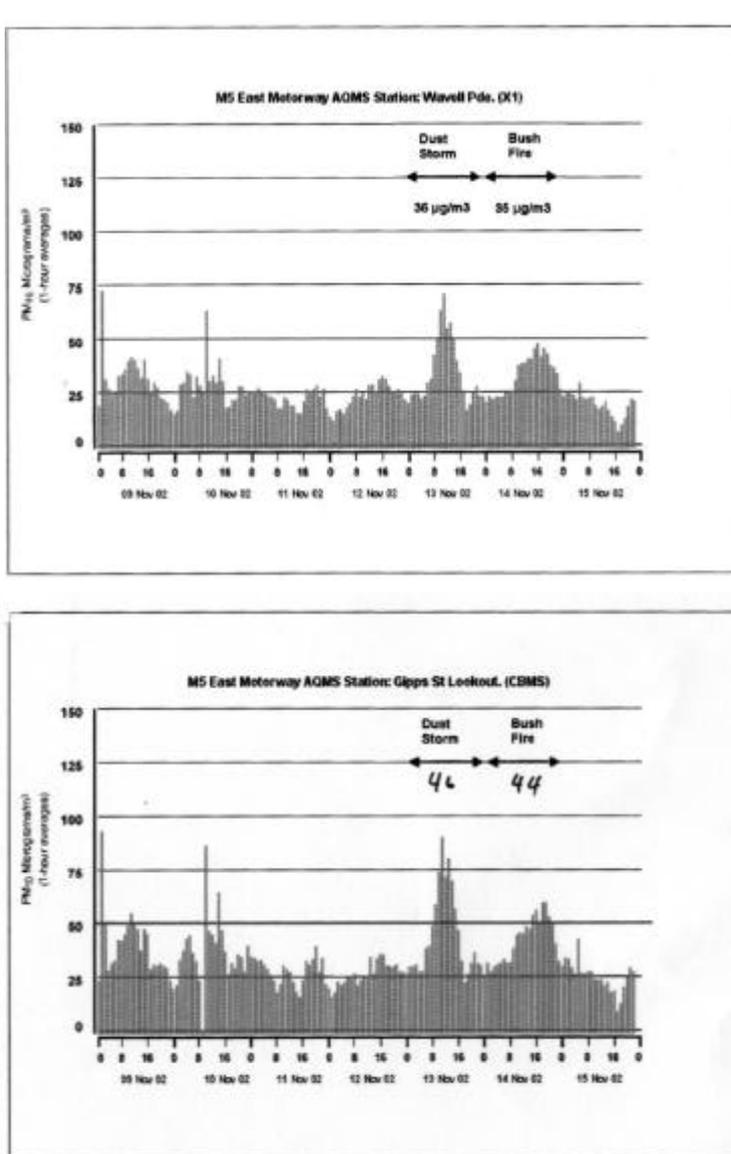
⁶⁵ Curran, *Evidence*, 18 November 2002, p 62.

The stations are U1, T1, X1 and CBMS. Imagine that the stack is roughly in the middle of that diagram. The days, which are marked, were days last week. We had one day of very bad pollution due to a dust storm and another day of very bad pollution due to a bushfire. Everyone was complaining about it. On none of those days did the pollution go over 50 micrograms per cubic metre [24-hour average] at any of those stations. It got to 50 at one of them, but it did not go over it. The regulation says that basically you can pollute up to 50. So long as you stay below 50, it is okay. If you go over it, no. Now you know what 50 means. It is like last Wednesday [13 November] and last Thursday. The stack is technically able to pollute up to that level and still comply.⁶⁶

Figure 4.4: PM₁₀ 1 hour average readings for week 9 Nov 02 - 15 Nov 02



⁶⁶ Curran, *Evidence*, 18 November 2002, p 62.



Source: RTA website , tabled by M Curran 18 November 2002.

4.52 Dr Holmes explained the difficulty in identifying the stack emission among the background of other pollutant sources:

We do not have any particular marker compounds that we can readily use to identify emissions from the stack. So these changes that we are trying to detect are against a background of emissions from other roadway sources and also against a varying background that is going to be influenced by meteorology.

It has been suggested that we should perhaps be focusing on other emissions such as benzene or ultra-fine particles but, in my opinion, we have the same sort of problems with these as well. They are more minor components of the emissions and, again, they will be against the background of contributions...⁶⁷

⁶⁷ Holmes *Evidence*, 18 November 2002, p 52.

4.53 Dr Best however, presented a different perspective on the potential for using an emission marker:

If we are concerned there is a big problem we could put something into the plume and measure it with sensitive instrumentation downstream. It is possible to confirm links.⁶⁸

4.54 In evidence, while being questioned about the conclusions drawn in the Holmes report and cited by the RTA in their submission, Dr Best highlighted the difficulties in relying on average data without further analysis of incident specific data:

The Hon JOHN RYAN: The conclusions given to the Committee, from the RTA submission pages 14 and 15 were:

...

The Hon JOHN RYAN:

Other pollutants show very little change between the pre and post tunnel periods. Some concentrations have decreased by small amount and others have increased marginally.

Dr BEST: I think Dr Holmes has looked at mean values, annual average values and the cumulative distributions. That is good first a step; I was trying to say: Let us have a look at things on different day types; that is the next level of analysis. Are there effects due to the stack that are discernable on the data? Yes there are. Are they significant? That depends on whether or not we are measuring the things that can actually affect people's health and odour environment.

The Hon. JOHN RYAN:

The measured concentrations show that whatever contribution the ventilation stack emissions make to ambient concentrations of CO, PM₁₀, nitrogen dioxide or nitrogen dioxide at the monitoring sites, these are well below the level of pollutants from other sources and far too small to be identified in existing background levels.

Dr BEST: That I think is difficult from a first look to identify. I do not know whether that is necessarily the case it is not possible to identify. The first point really says: I think the analyses have been done against guidelines, 8-hourly guidelines, 24-hourly guidelines. When you look there it is difficult to see sometimes. The question of whether or not there are stack impacts and the significance of them is something I think we need discuss further.⁶⁹

4.55 Dr Best elaborated further:

...I do not dispute the way Dr Holmes analyses data, it is a question of what measures you look at. One of the things we are hoping to do jointly over the next three months is to go back and look at a wide number of the episodes which we think are ascribable and we will be able to report back to the RTA and RAPS various things like what you can actually conclude about the stack impact...

⁶⁸ Best *Evidence*, 15 November 2002, p 14.

⁶⁹ *Evidence*, 15 November 2002, pp 18-19.

4.56 The GRIMM located at U1 has the capability of simultaneously measuring PM₁₀ and PM_{2.5} and thus allows determination of relativity between the two:

Dr HOLMES: We have not done any analysis on it for this study for the reasons I have just said: It is not an instrument that is used for compliance testing and will not be used for compliance testing for PM_{2.5}, but what we have got out of it so far is that, on average, about 65 percent of the PM₁₀, according to the GRIMM measure, at the moment is PM_{2.5}.

...

CHAIR: Do you know how that would compare with ordinary ambient air?

Dr HOLMES: It is in the same order. It varies, but it is in the same order. It might be a bit higher on average.

CHAIR: It is about 38 percent in ambient air normally, is it not?

Dr HOLMES: Well, it ranges. It is about 40 percent, but it ranges from 30 to 80 percent, depending on what the sources of the particulates are, and if you have a lot of woodfire smoke then it can be quite high, so in winter it can be quite high when you have those sources. In summer it can be lower because you have more particulates from, say, dust storms.⁷⁰

4.57 Dr Best offered an explanation for the seeming disparity between the air monitoring data and the odour report:

Stack monitoring and the ambient monitoring is only looking at carbon monoxide, PM₁₀ and nitrogen dioxide. If there are other compounds, especially at trace levels which can cause problems in sensitive people the fact that national guidelines are not exceeded does not mean there are not going to be health impacts; does not mean there are not going to be severe problems with amenity.

.... investigated odour and health complaints around an oil-shale processing plant in Gladstone where the EPA could not understand why people were complaining. I think the studies are showing that things that were not being measured are actually causing the problems, but I will leave it for them to talk about that.⁷¹

4.58 In submission to the Inquiry RAPS also questioned the validity of drawing strong conclusions from the Holmes report:

Recently the RTA claimed that the monitoring record round the stack showed that there had been no change in local air quality as a result of the stack and quoted a simple collation of the monitoring record for the first six months of operation of the tunnel compared with the equivalent period last year. This appeared to show that the mean levels of pollutants such as PM₁₀ had actually dropped marginally.

The analysis is flawed as the variability of the data makes it impossible to draw any conclusion from such a simple analysis. The only responsible conclusion which could be drawn is that no conclusion can be reached. The fact that people are

⁷⁰ *Evidence*, 18 November 2002, p 53.

⁷¹ *Evidence*, 15 November 2002, p 14.

getting sick with such regularity is a clear demonstration that the predictive tools (the air quality modelling) and the air quality goals are inappropriate and inadequate to predict health impacts from the stack or to provide protection to the public.⁷²

4.59 During the public hearings Dr Manins from the CSIRO presented some diagrammatic representations of the influence of the stack during June 2002 as measured at two of the air quality monitoring stations. Dr Manins then interpreted the diagrams for the Committee;

The next slide is for the community based monitoring station, which is to the south-west of the stack. Its intention is to pick up the highest ambient concentrations of particles and NO_x from the stack and, via picking up the highest, to then be able to estimate exposure in the whole region. You can see that these pollution roses are in June this year. The density of points shown on the pollution roses is quite high from the south, from the west, from the north, and quite low from the direction of the chimney stack, both for NO_x and for particles. This does not mean that the stack is having no effect, it just means that it is not having an effect very often. The majority of the cause of pollution in the region seems to be, in June, coming from other wind directions, not from the stack direction.

The final slide is the one to the north-west of the stack where most of the people who seem to be directly affected are located, again in June. There are some cases where there are elevated pollution levels from the stack, it is not clear what those levels are without further analysis, but the vast majority of the time the pollution is coming from other wind directions, so it would appear to me that the other controls that are under way, the other efforts to reduce the use of wood smoke, the buy-back programs and such things, are very important to reducing exposure of the population to elevated pollution levels, but that is not to say the stack is not important. I agree that the stack can be important, but very rarely.⁷³

4.60 This again highlights the difficulty of accurately determining the effect of a point source of pollution such as the stack when using regional air quality measurements without, as Dr Manins said, further analysis. In many respects these diagrams provide a representation of a prevailing wind direction of west in June in Sydney.

4.61 In evidence Mr Mark Curran of RAPS provided the Committee with a reading from the RTA monitoring data which he interpreted as a clear example of the influence of the stack – a plume strike:

I believe that in fact there are clear examples of impacts of stack emissions on the monitoring stations and one of them, a specific one which is fairly clear, is included in the RAPS submission [p 30]. There are many, many others. The one that is shown was sufficient in two hours to add about 30 micrograms per cubic metre or 1.25 micrograms to that day's reading. With the variable winds that we have around the stack, many of these of course go undetected. This is effectively a graphical representation of the video of the plume strike that many of you will remember from Dr Manins' presentation to the last inquiry. I apologise to those

⁷² RAPS, *Submission No. 88*, p 30.

⁷³ Manins, *Evidence*, 18 November 2002, p32-33.

who have not seen it, but this is a plume strike, there is a great big high sort of impact.⁷⁴

- 4.62** The plume effect was further examined during the public hearing of 18 November 2002. The Hon John Ryan quoted a document prepared by Dr Holmes which said:

*The plume width will be in the first instance determined by the diameter of the stack but once released into the atmosphere, plume width will be governed by prevailing dispersion conditions. Under good dispersion conditions the plume will widen rapidly, however the plume has the potential to remain narrow for long distances under poor dispersion conditions, that is, a stable atmosphere often referred to as an inversion which can occur at night, particularly in winter.*⁷⁵

- 4.63** A narrow plume could have many effects on the data monitoring outcomes. It could explain the short term individual spikes such as that cited by Mr Curran in evidence. A narrow plume of say 5 degrees width has the potential to miss the monitoring stations and strike houses directly and so not be measured.

- 4.64** In response to the question of whether he could draw the conclusion that the stack was operating satisfactorily based on the information he presented to the Committee. Dr Manins conceded:

I cannot judge that without looking further at what is being emitted - I do not have enough data on that - at the same time as what is being measured in the ambient. You have to relate the two. ... You would need to do the analysis.⁷⁶

- 4.65** The air quality monitoring stations were established to provide information on whether the M5 ventilation stack was causing a health problem. Based on the evidence of witnesses to the Inquiry there are sufficient grounds to doubt that the local monitoring network is capable of measuring the true impact of the stack emission on the local area.

Tunnel air quality

- 4.66** As discussed earlier in this chapter, carbon monoxide is monitored within the tunnel. NSW Health provided the following advice to the Committee on the other key motor vehicle pollutants of concern:

Dr STEWART: ...Fine particle levels are principally controlled in tunnels to ensure adequate visibility for safe driving. The M5 East tunnel is managed to comply with international standards for visibility....

...

...Nitrogen dioxide is one of the criteria pollutants monitored in ambient air. At present we do not have information regarding nitrogen dioxide levels in this tunnel and I am advised that this is usual international practice as only the pollutant of immediate critical concern, carbon monoxide, is routinely monitored in tunnels.

⁷⁴ Curran *Evidence*, 18 November 2002, p 62.

⁷⁵ Fax from Holmes K, to Isles S, quoted in Ryan *Evidence*, 18 November 2002 p 56.

⁷⁶ Manins, *Evidence*, 18 November 2002, p 34.

I turn now to benzene and toluene. Motor vehicles also emit a range of other compounds, including benzene, toluene, formaldehyde and acetaldehyde. If the levels are very high, up to 500 parts per million, there is the potential for immediate effects such as headache and eye or airway irritation.⁷⁷

In-tunnel study

4.67 The Committee was advised that NSW Health had commenced a study of pollutant levels in vehicles using the M5 East tunnel. Data collection commenced in October with collection of in-cabin levels of fine particles, nitrogen dioxide, carbon monoxide, benzene and toluene. The collection is to occur under three different cabin ventilation scenarios, namely:

- Vehicles with vents and windows closed.
- Vehicles with windows closed and vents open.
- Vehicles with the window down (Health consider this scenario similar to a motor cyclist).

4.68 Data collection is occurring during morning and afternoon peaks and the samples will be analysed by the CSIRO, Melbourne. Analysis and reporting of results will occur over several months once this collection of air samples is complete. NSW Health advised that they anticipate the study will provide the following outcomes:

- information on which to base advice for motorists of means to reduce pollutant exposure while using the tunnel; and
- indicative levels of pollutants in the tunnel, some of which may be able to be compared to relevant health-based goals.⁷⁸

4.69 The description of the intended outcomes of the study provided to the Committee appears to be very qualified. In particular, the first aim of the study appears to be very modest as NSW Health already suggests motorists be advised to wind up their windows while travelling through the tunnel (see Chapter Five). However, the report on the conduct of the study and its results will be received with much interest.

4.70 The Committee also notes that during later evidence Dr Greg Stewart indicated that the in-tunnel study would provide NSW Health with desired information on the likely effect of short-term in-tunnel exposures.⁷⁹

⁷⁷ Stewart *Evidence*, 18 November 2002, pp 39-40.

⁷⁸ NSW Health *Evidence*, 18 November 2002, p 41.

⁷⁹ Stewart *Evidence*, 18 November 2002, p 44.

Enforcement

- 4.71** PlanningNSW on behalf of the Minister for Planning (as the approval authority) is responsible for ensuring the on-going compliance with all of the Minister's Conditions of Approval. It has a continuing role in the implementation of the air quality conditions of approval, and particularly, operational monitoring and compliance reporting. In undertaking this role they consult with the EPA and NSW Health as well as the RTA.
- 4.72** The working relationship between the RTA and BHBB is governed primarily by the Design, Construct, Operate and Maintain Deed for the Motorway which was signed in August 1998 (the Deed), and the documents which it incorporates (such as the Scope of Works and Technical Criteria and Environmental Documents). Among other things the Deed provides that BHBB is obliged to ensure that the Motorway is at all times open to the public for safe continuous and efficient passage of vehicles; and fit for the purpose for which it is required.

Interpretation and enforcement of conditions

- 4.73** Submissions to the Inquiry from opponents to the unfiltered exhaust stack outlined their concern regarding the enforceability of the conditions of approval and what they considered to be the willingness on the part of the regulating authorities to allow for reinterpretation of these conditions. The issue of the interpretation of WHO guideline for in-tunnel CO exposure was examined earlier in this Chapter. The Residents Against Polluting Stacks outlined their concern:

The experience of the M5 East so far has shown many of these conditions to be very loose or unenforceable, with vague accountabilities, no specified penalties, or even consequences for any breaches.

It is particularly alarming therefore when even these minimally set conditions are not enforced, and attempts are made to reinterpret and relax the conditions rather than ensure full compliance.⁸⁰

- 4.74** In evidence, RAPS representative Ms Judi Rossi related the response she received from RTA representatives at a meeting to discuss the complaint procedure:

...Under the approval conditions, all they were required to do was advertise a complaints procedure basically, not necessarily do anything more with it. That was their [the RTA's] interpretation.⁸¹

- 4.75** Ms Giselle Mawer of RAPS drew the attention of the Committee to an unsigned RTA briefing note, which had been submitted under the Legislative Council call for papers, as being indicative of the approach to enforcement of the conditions of approval:

⁸⁰ RAPS, *Submission No. 88*, p24.

⁸¹ Rossi *Evidence*, 18 November 2002, p 59.

Whilst Condition 70 mandates the WHO CO goal during both design and operation, it might be argued that Condition 71 restriction on portal emissions refers only to the design phase.⁸²

4.76 However, while reinterpretation of conditions is apparently allowed in favour of the tunnel operators it appears that less flexibility is evident in terms of applying harsher conditions. This emphasises the importance of drafting and setting conditions that are adequate in the first instance and that allow for change as circumstances require. A PlanningNSW document that was made available as a result of a Legislative Council order for papers illustrates this point:

The issues raised on the M5 East indicates that whilst there is was much focus on the external air quality issues, the in-tunnel conditions have proven to be more problematic. To some extent this may be systematic [sic] of designing tunnels to meet specific air quality specifications without leaving sufficient spare capacity for any irregularities. Whether or not this is the case requires investigation.

At this stage it is recommended that the regulators obtain information on CO levels recorded at any time and at any monitoring station above 200ppm (3 minute average) to establish the frequency and potential extent of the issue. Should it become apparent that there are problems with exposure to very short tem CO levels, it is recommended that PlanningNSW in consultation with NSW Health enter into formal discussions with the RTA to introduce *voluntary additional improvement measures (ie it is not something that PlanningNSW could legally require)*.⁸³

Environmental Protection Authority

4.77 The Conditions of Approval provide a role for the EPA particularly at the development stage of reporting mechanisms. There is a view that the EPA should have a stronger role in terms of monitoring and compliance, including compliance auditing:

...One of the interesting things from the EPA is that because they have had experience with licence conditions - and I think probably a bit more experience than Planning NSW - they are very clear on what constitutes a breach and what does not...

That is what the community expects. If we have strict conditions then we expect strict enforcement, otherwise they are not strict, they are not worth the paper they are written on.⁸⁴

4.78 The EPA responded to the question whether they should have a role in compliance auditing of monitoring data:

Mr WOODWARD: As I said EPA has been involved in terms of assessing information, along with the community and others as well. The condition for the tunnel has been provided by the Government, the Minister for Urban Affairs and Planning. It is an issue that you would need to talk to Planning NSW about in

⁸² (Tabled document) by Giselle Mawer, 18 November 2002.

⁸³ PlanningNSW document: *Report on In-Tunnel Air Quality Issues Relating to the Operations of the M5 East*.

⁸⁴ Mawer, *Evidence*, 18 November, 2002, p 67.

terms of compliance with its conditions. EPA does not have a strict regulatory role.

The Hon JOHN JOBLING: How have you tested this?

MR WOODWARD: That is a question that will need to be added to by NSW Health and PlanningNSW. It is a planning consent condition and the planning consent authority is the regulator for that condition. It is very important to say there is no reason to suggest the levels that have been measured are incorrect. In fact there is every reason to suggest they are correct based on the instrumentation that is in there, monitoring required, community involvement, collaboration requirements and indeed the fact that it has monitored excessive levels. If there was a concern they were reading incorrectly one might think there were never any exceedances shown. That has not been the case. There has been no suggestion that is an issue.⁸⁵

4.79 Condition 70 states that the proponent must include any reasonable requirements of the EPA which aim to improve in-tunnel air quality, as requested by the RTA:

CHAIR: From evidence this morning, from people we have talked to and evidence we have received in submissions, residents are indeed suffering quite bad health impacts as a result of stack emissions, albeit the monitoring levels do not show that they should be suffering. If we could take that as a given and the fact there is a high level of fine particulate matter in the tunnel, would it not be reasonable request under Condition 70 for EPA to ask RTA to install filtration in the tunnel?

Mr WOODWARD: We need to rely on the advice from NSW Health on that and that is work they are doing in terms of those surveys and the concerns that have been raised by the community about the health impacts. I cannot arbitrate over the information that the community has given in relation to health issues. That really is an issue that not only needs to be addressed by health in terms of further advice but it is being addressed by health.

CHAIR: If Health came to the same conclusion, under Condition 70 would EPA be asking RTA to install a filter?

MR WOODWARD: Condition 70 is open ended in terms of reasonable requirements. I do not think I can speculate what should or should not be required out of a response that may or may not happen out of the health inquiry other than to say we would take it very seriously and we would do whatever was needed along with other Government agencies to ensure the community is protected.⁸⁶

4.80 The Environment Protection Authority has had a continuing involvement in terms of providing advice to PlanningNSW. However, it does not have a role in enforcement. The EPA does not licence everything that can cause pollution. It does not licence motorways.⁸⁷ However, the level of community concern over the M5 suggests there is a general

⁸⁵ *Evidence*, 15 November 2002, p 41-42.

⁸⁶ *Evidence*, 15 November 2002, p 42.

⁸⁷ Woodward, *Evidence*, 15 November 2002, p38.

expectation that in future tunnel proposals the EPA should license significant point sources of pollution, such as the tunnel exhaust stack.

Recommendation 3

The Committee recommends that the NSW Government take action to ensure that conditions of approval for motorway tunnels include the requirement for the Environment Protection Authority to have a direct compliance and enforcement role with respect to pollution.

Conclusion

4.81 From the issues raised in this chapter there are clearly concerns as to the air quality that is occurring as a result of the M5 East tunnel. These concerns relate to the external air quality, through residents affected by the stack, and, increasingly, residents around the portals. They also relate to in-tunnel air quality. The next chapter examines the potential health and safety risks posed to residents and tunnel users if air quality is not adequately addressed.

Chapter 5 **Health and safety of local residents and tunnel users**

At the previous two Inquiries there was an understandable focus on the ventilation stack and the predictions of what might occur in terms of air quality external to the tunnel. Comparatively little focus was placed on the in-tunnel air quality issue. It is perhaps ironic that to date the exceedances of air quality guidelines as measured according to the conditions of approval have occurred *within* the tunnel.

Nevertheless, local residents report that the concerns they expressed prior to the opening of the tunnel regarding the impact of the ventilation stack on their health have been realised. The debate as to whether these ailments can be attributed to the ventilation stack has understandably caused distress and acrimony, and there is no consensus as yet that appropriate monitoring of health effects is being undertaken.

The Committee recognises that there is continuing medical research on the impacts of some of the issues considered, such as particulate matter. There is also continuing development of national standards on the damaging effects of vehicle emissions. However the Committee can understand the anxiety of residents and tunnel users potentially affected while experts reach a sufficient level of certainty on these issues.

Health impacts on local residents

- 5.1** Air pollution emitted from the tunnel stack is comprised of pollutants emitted in particle and gaseous form by motor vehicles using the tunnel. Pollutants concentrated from the entire length of the tunnel and recirculated through the tunnel, are emitted from a single stack, which becomes a point source of emission. After emission from the stack the pollutants are dispersed in the air, with the concentrations significantly elevated in the close proximity to the stack exhaust, and gradually decreasing to background levels.⁸⁸
- 5.2** The presence of residential houses, industries and schools in the vicinity of the exhaust results in the potential for elevated human exposure due to the elevated pollutant concentrations. The potential depends on the ability of the vent at all times to operate according to its specifications, traffic volumes, the concentration of the plume, wind direction and many other factors.

The fears and concerns of local residents

- 5.3** The Committee received 74 submissions from individual citizens that raised concern or dissatisfaction with either the tunnel or the ventilation stack.

⁸⁸ Morawska, *Submission No. 95*, p1.

- 5.4** Fifty-six submissions were made by local residents. In those submissions residents related the negative impact the ventilation stack has had on their health and well-being. New or exacerbated ill-effects reported since the operation of the ventilation stack included: eye irritation, headache, cough, wheezing, mucus, asthma, and an awareness of strong odour.
- 5.5** A number of submissions were received from various members of single and extended family units. In all 38 households made submissions to the Inquiry. There is a deep sense of community and family in the local area, and submissions relayed the dismay of people who feel they have no option but to leave the area and thus disrupt their family network. Some households reported they had already experienced this disruption, with sons and daughters either moving away from the family home or no longer being able to visit for long periods.
- 5.6** While many examples were provided in submissions these two residents' experiences illustrate the type of concerns expressed:

For my family, living just over 300 m north west of the chimney, on the ridge approximately 15m higher than the top of the stack, the pollution emanating from the chimney has changed our lifestyle. My wife and daughter now require medication on a regular basis and have been forced to become vigilant of the weather conditions and wind direction in their daily lives. The windows to our homes are mostly shut to keep out the odours, and going outdoors is no longer taken for granted without thinking of the hour and the wind direction.⁸⁹

and

Since the M5 East opened last December 2001 when the winds come from the East or South East I have suffered a number of headaches and my breathing has become more difficult. Now I have to use a puffer twice a day and even then I am still very chesty. Its not easy when you are retired and only go out two afternoons a week to get away from the pollution.⁹⁰

- 5.7** At the commencement of the public hearing the Committee heard evidence under oath from local residents on the effect the ventilation stack had had on their lives.
- 5.8** Mrs Gotsis told the Committee how her daughter who has a chronic viral illness can no longer visit for extended periods:

Now she can only visit occasionally—and if she does she almost never stays the night—in fact never since this bad incident—and she used to often stay the night, some times for several nights. ... Unfortunately on several occasions this year when at home Eleni had complained that when she opened her window upstairs it was, as she put it, “like being at the rear of a car near the exhaust pipe.” Anytime she has complained of the smell she has always developed a headache. One day it was so bad for about three to four hours that she became quite breathless and very distressed and I had to drive her home. On each occasion once she went

⁸⁹ Rossi R, *Submission No. 46*, p1.

⁹⁰ Day M, *Submission No. 18*, p1.

back to Bronte her headaches disappeared—and on that one occasion her breathing problems stopped once well away from Bardwell Park.⁹¹

5.9 Mr Snepvangers explained his primary concern was for his daughter:

The other issue for me is I have a four-year-old daughter. I really like the area. I have lived there for a long time. I do not want to move, but I am coming to the stage where I have to sell the house or get this thing filtered, in whatever format. If people do not believe filtration works and it only works 50 percent, 50 percent of taking stuff out is going to increase my life....

...My daughter plays on a trampoline in the backyard. She complains that the air tastes funny and the air smells funny, and I can smell it as well. It is a rubbery, diesel sort of smell....⁹²

5.10 Ms Magda Dancz lives on the ridge that faces the stack. Her home is 401 metres away from the stack – that is one metre outside the property buy-back circle:

Since the opening in December last year, we have been constantly sick, especially myself and my daughter. We started noticing smells in January and greasy dust on our windows, everywhere in the house. I cannot leave my windows open at all most of the time. Sometimes we have woken up at night with a very bad smell like diesel and rubber burning. I have never had problems like this before⁹³.

5.11 Not surprisingly, residents are angered and distressed when their concerns for their families' health are seemingly dismissed by government agencies. Mr Briers evidence demonstrates this:

They are not figments of the imagination or subjective allegations, as was suggested at the recent Budget Review Committee Meeting.⁹⁴

5.12 At a budget estimate committee hearing on 23 October 2002, the Minister for Transport, Mr Carl Scully, gave the following response to the claims by residents that their health had been affected by the ventilation exhaust:

The RTA is not aware of any health complaints in relation to stacks at the Melbourne tunnel, the Perth tunnel and the harbour tunnel. For some reason we have an extraordinary number of complaints arising out of the opening of the M5 stack.

When the pollution levels before and after show no discernible difference, it is probably a reasonable extrapolation to say that if people are suffering those health outcomes, they are for reasons other than the opening of the stack.⁹⁵

...

⁹¹ Gotsis, *Evidence*, 15 November 2002, p 3.

⁹² Snepvangers, *Evidence*, 15 November 2002, p 5.

⁹³ Dancz, *Evidence*, 15 November 2002, p 6.

⁹⁴ Briers, *Evidence*, 18 November 2002, p 58.

⁹⁵ GPSC4 Budget Estimates Committee, 23 October 2002, p3.

There are no other comparable complaints from comparable stacks opened in other roads.⁹⁶

5.13 The comments by the Minister should perhaps themselves be compared to the examination of the unique location of the stack contained within the *Report on Inquiry into the M5 East Ventilation Stack (2001)*. The 2001 report noted that the remote stack location in a shallow valley surrounded by residents was considered a scientifically poor choice.⁹⁷

5.14 The Minister also stated his position with respect to calls for installation of filtration equipment:

Local residents allege symptoms and claim they are the result of the M5 stack, and they have been referred to NSW Health. The RTA is not a health authority. So far as these complaints are concerned that is the prerogative of the Department of Health.⁹⁸

...

As I have said before – and I will say it again – I am not going to install a high-tech placebo that makes people feel good. As I have said before, in the face of very strong advice of no discernible difference – it deals with a percentage of particulates, as you know – in the pollution levels before and after, even if it extracts a reasonable percentage of particulates, it makes no difference to the quality of the air shed. It does not deal with all the other things that come out of the exhaust of a motor vehicle. It does not deal with oxides and nitrogen, carbon dioxide or carbon monoxide.⁹⁹

5.15 The increase in evidence and concern regarding the effects of particulate matter, particularly ultra-fine particulate matter, is discussed later in this Chapter.

The link between odour and health complaints

5.16 The Committee heard evidence from air quality expert Dr Kerry Holmes on the likely difficulty in measuring or detecting the presence of small but harmful concentrations of air toxics such as benzene and toluene:

I think it would be extremely difficult. I think if odours are being detected there, and that is what was reported, that the reality is the human nose is still the most sensitive way of measuring odour and detecting very small quantities of these sort of compounds.¹⁰⁰

5.17 The Committee heard evidence from Dr Peter Best, Air Quality Scientist, who provided an overview on a community response project that collated and analysed information from odour observation forms. The project was initiated by RAPS, who also distributed the

⁹⁶ *ibid*, p4.

⁹⁷ *Report on Inquiry into the M5 East Ventilation Stack (2001)*, July 2001, p73.

⁹⁸ GPSC4, Budget Estimates Committee, 23 October 2002, p4.

⁹⁹ *ibid*, p6.

¹⁰⁰ Holmes *Evidence*, 18 November 2002, p 54.

forms to residents to allow them to record their observations in a consistent way. The study report, which was tabled to the Committee, analysed the complaint log information for the period from 24/1/02 to 30/6/02 for Earlwood and Turrella residents. Dr Best advised:

When you do get odour complaints in a community, it really does indicate that there is probably widespread odour annoyance occurring. People are fairly loath to complain, for a number of reasons. In many situations when I have dealt with odour complaints, when you start investigating fully by doing odour surveys, talking to people further, you realise that there are many more people who are feeling the effects but for various reasons will not put their names to it...¹⁰¹

You will see some of the symptoms we are talking about, irritation of the throat, mucus, itchy eyes, wheezing and general asthmatic responses. These are all very common responses you get from people having odour problems.¹⁰²

5.18 Associate Professor Chris Winder, Head, School of Safety Science, University of NSW, in his submission to the Inquiry advised that particulate numbers in the submicron range have been shown to increase significantly at locations close to busy roads as motor vehicles, especially those with diesel engines, emit large numbers of these particles. The effects of short term high level exposure include cough, excess phlegm production, mild to severe irritation of eyes and upper airways and exacerbation of asthma.¹⁰³

5.19 Dr Best advised the Committee on the increasing scientific evidence of the link between odour and health:

...there are a number of studies now showing that where once it was thought you got odour complaints way before you got health complaints, there is a lot of recent evidence to show that in fact odours can trigger changes in immune systems of people...¹⁰⁴

...There are indeed strong linkages between odour and health and it really is, to my mind, irresponsible to dismiss complaints without a full evaluation.¹⁰⁵

5.20 The Director General of the EPA was questioned on that Department's response to the local community's complaints of odour:

The Hon MALCOLM JONES: In the evidence this morning people were talking about when the wind is in a particular direction and the difficulties associated with determining which way the wind is blowing because of the topography of the terrain. When they talk about complaints of smells of vehicle emissions and burnt rubber does that not trigger in EPA that something is wrong?

¹⁰¹ Best *Evidence*, 15 November 2002, p 9.

¹⁰² *ibid*, p 12.

¹⁰³ Winder, *Submission No. 98*, p 5.

¹⁰⁴ Best *Evidence*, 15 November 2002, p 9.

¹⁰⁵ *ibid*, p 15.

Mr WOODWARD: Of course it does, that is why we have met with the residents to try and understand these issues but importantly that is why, as I said, NSW Health in particular is looking at the actual details of that and doing more of an in-depth study on the potential impact of people's health.¹⁰⁶

Sensitive populations

5.21 It was submitted to the Inquiry that some sub-groups such as the elderly, children or those with allergies can be more sensitive to the adverse health effects of toxicants. They are adversely affected by toxicants at concentrations considered safe for other members of the community. Ambient air quality standards are set to 'protect' the general population, not sensitive groups. Recent research suggests that existing ambient air quality standards may be too high.¹⁰⁷

5.22 The Committee also heard evidence from Dr Best that air quality guidelines do not necessarily protect the more sensitive in the population:

I note that the National Environment Protection measures only deal with single pollutants. They are very much a first step. We know from a variety of studies that mixtures of pollutants can cause more than additive effects. It may be 10 years before we get around to legislate that, but just because air quality guidelines are met does not mean to say that people who are pollution sensitive are not being affected. I cannot say that strongly enough.¹⁰⁸

5.23 Dr Best referred to a study in Darwin which demonstrated that sensitive populations were affected at levels much lower than current standards:

The Darwin study is interesting because it shows as soon as you get well-measured PM10 levels going over 35 micrograms per cubic meter over a 24-hour average you are talking about sensitive people being affected; you do not have to wait to get up to fifty. Guidelines and guideline exceedances is all very well and it is a good way to be able to monitor things but the important thing is health impacts. We have to look at the studies carefully and say: What do we believe is likely to happen to very sensitive people? If we are not careful we are going to miss or not deal properly with a decent, may be ten percent of population size.¹⁰⁹

NSW Health study

5.24 Dr Gregory Stewart, Chief Health Officer, NSW Health informed the Committee of the study to be undertaken by NSW Health:

NSW Health has received complaints from approximately eighty residents of headaches, eye irritation and increased or new asthma that have occurred since the

¹⁰⁶ Woodward, *Evidence*, 15 November 2002, p34.

¹⁰⁷ Winder, *Submission No. 98*, p8.

¹⁰⁸ Best, *Evidence*, 15 November 2002, p 14.

¹⁰⁹ Best, *Evidence*, 15 November 2002, p 18.

tunnel opened. Representatives of NSW Health have met with residents on several occasions. Following from these meetings it was decided an investigation of these concerns should be undertaken. Initial assessment demonstrated that there has been no significant change in pollutant levels in the vicinity of the tunnel compared to the previous year.

Residents reported significant odour impacts however and officers of NSW Health believe that the health complaints may be odour mediated and we have briefed several specialists in chemical sensitivity, respiratory medicine and epidemiology on this situation. Following several meetings with these specialists, NSW Health has requested a proposal to investigate these complaints to determine if they are related to stack emissions. The time frame for that study will be months, six months would be the shortest but possibly longer than that. Health impacts related to odour is an emerging area of environmental health research. It is postulated that odorous compounds may cause symptoms below levels of exposure known to cause toxic effects and possibly these impacts are mediated by central nervous system pathways...¹¹⁰

- 5.25** “Odour-mediated” is *not* a synonym for psychosomatic illness. NSW Health explained that when people perceive an odour this can trigger an actual chemical response in their body that in turn can trigger complaints such as asthma, eye irritation or headaches. The basis for the study is that 80 people have reported inflamed or new symptoms and that there is no evidence of an increase *in terms of general air pollution levels in that part of Sydney*.¹¹¹
- 5.26** NSW Health advised that they will study these people particularly well and that they will compare them to people who are not having these effects. In Chapter Four the Committee has recommended that localised air quality monitoring of the affected resident areas be undertaken.
- 5.27** The Committee commends the approach by NSW Health to give serious consideration to the significant numbers of people in the local area reporting adverse health symptoms since the opening of the tunnel in December 2001.

Particulate matter (PM)

Health risks associated with PMs

- 5.28** The NSW Environment Protection Authority (NEPM) advised that the Air NEPM standard for fine particles is exceptional in that it does *not* contain a known significant margin between the set goal and any known adverse health impact. There is no evidence that there is a threshold concentration of either PM₁₀ or PM_{2.5} for which adverse health effects will not be observed.¹¹²

¹¹⁰ Stewart, *Evidence*, 18 November 2002, p 41.

¹¹¹ *Evidence*, 18 November 2002, p47.

¹¹² Environment Protection Authority, *Submission No. 87*, p1.

5.29 The submission of Associate Professor Lidia Morawska of the School of Physical and Chemical Sciences, Queensland University of Technology, provides an overview of the health effects caused by exposure to airborne particulate matter:

Health effects of airborne particulate matter include both long-term effects and acute effects. The latter include: ‘increased daily mortality, increased rates of hospital admissions for exacerbations of respiratory disease, fluctuations in the prevalence of bronchodilator use and peak flow reduction’ (WHO 2000). It is known that daily (24 hour average) increase of concentrations is associated with the acute effects. It is expected that this could be the case also for much shorter, temporal increases of concentrations, however, due to the monitoring techniques used by most monitoring networks, usually only 24 hour average data is available, not the peak value concentrations or duration of the events of peak concentrations.

There has been no threshold level of concentration identified below which health effects would not occur, which means that:

- even at low concentrations a certain fraction of the population will be affected
- compliance with national standards for particle concentration does not imply that there will be no health effects occurring due to the exposures
- any increase in concentrations results in a linear increase of occurrence of health effects. It has been shown that for PM₁₀ for example, an increase of every 10 µg/m³ the day before results in an increase of 0.5% in daily mortality (eg Samet et al 2000).¹¹³

5.30 During his presentation to the Committee Dr Peter Manins of the CSIRO outlined new information on the mortality effects of PM_{2.5}:

Figure 5.1: PM_{2.5} Studies and Dose-Responses

Health Endpoint	Age Group	Dose-Response % increase per 10 µg/m ³ increase in PM _{2.5}	95% confidence interval	Reference
Short term effects (24-hour average)				
Mortality				
All causes	All ages	2.3	1.3–3.3	Goldberg et al 2000
Respiratory	All ages	8.6	5.2–12.4	Goldberg et al 2000
Cardiovascular	All ages	1.0	0.15–1.9	Moolgavkar et al 2000a
Hospital Admissions				
Asthma	All ages	2.6	1–4.2	Burnett et al 1999
Cardiovascular	Elderly	1.7	1–2.4	Moolgavkar et al 2000b
COPD	Elderly	2.6	0.4–4.8	Moolgavkar et al 2000c
Long term effects (annual average)				
Mortality				
All causes	All ages	6	2–11	Pope et al. (2002)
Lung cancer		14	4–23	JAMA 287(9)
COPD		9	3–16	1132–1141

http://www.ephc.gov.au/pdf/Air_Variation_PM25/draft_variation_is.pdf p21

Source: Dr Peter Manins; Presentation; 18 November 2002

¹¹³ Morawska, Submission No. 95, p1.

The next slide presents what is generally regarded as very new information, in the past two years; in fact the lower part of the slide showing the long-term effects of fine particles was only reported this year. The table shows PM_{2.5} studies and response relationships, showing for example, if there was a 10 microgram per cubic meter increase of PM_{2.5} daily average, then mortality, deaths, are expected to go up by 2.3 percent. If the problem is cardiovascular diseases then it is expected to go up by 1 percent; for respiratory diseases in general, up to 8.6 percent increase of deaths in the community per 10 micrograms per cubic meter increase of fine particles. These are the short-term effects. The longer term effects, and again this is very new information, for chronic exposure to particle levels for every 10 micrograms increase, there is about a six percent increase in deaths over the standard death rate, which in Sydney is around about six deaths per 10,000 people per month; about 60 or 70 deaths per 10,000 people per year. For example, if the community numbered 10,000 people around the M5 and if they represented the general population -- and I do not know that -- then on average you would expect 60 or 70 deaths per year in that community due to all causes. If the chronic pollution of fine particles PM_{2.5} was increased from 10 to 20, then you would expect an extra six percent deaths in that community from all causes...¹¹⁴

Development of national standard for PM_{2.5}

- 5.31** Concerns have been expressed among experts for some time that PM₁₀ is not the best indicator for health impacts of particulate matter. Despite this, and in the absence of other standards at present, the RTA and PlanningNSW rely upon the PM₁₀ measure.
- 5.32** The submission of Associate Professor Lidia Morawska, provides a background to the use of particulate matters as a measure of health effects due to exposure to airborne particles:

PM₁₀ replaced TSP (total suspended particles) as an ambient air quality standard when the realisation came that health risk is related to inhalation of smaller particles, so called thoracic particles, which in simplified terms are smaller than 10µm. Later, epidemiological studies showed that exposure to particles smaller than 2.5 µm is even better correlated with health effects. Therefore, in the USA the National Ambient Air Quality Standards (NAAQS) [that were] introduced in 1997 included a PM_{2.5} standard.

Consideration is currently given in Australia to the introduction of a PM_{2.5} standard as well. From the understanding of mechanisms of particle inhalation deposition in the human respiratory tract it is known that the smaller the particles the higher is the likelihood of penetrations of the particles to the deeper parts of the respiratory tract. Taking into account that most particles emitted by anthropogenic combustion sources, including motor vehicles, and present in ambient air, are smaller than 1 µm, it is being considered that further modification of the regulation may take place. The modification could be [to] include introduction of PM₁ (mass concentration of particles with diameter smaller than of 1 µm) or particle number concentration (which is a better measure of very small particles) standards. For example, the revision planned in 2003 of the limit values for suspended particulate matter by the EU Framework Directive and the Daughter Directives for Ambient Air Quality will include consideration of PM₁.

¹¹⁴ Manins, *Evidence*, 18 November 2002, p 31.

In summary, while PM₁₀ has been clearly associated with health effects, higher associations have been shown with smaller particles PM_{2.5}, and are expected to be even higher for particles smaller than 1 µm. This implies that PM₁₀ is not the best indicator of likely health effects due to exposure to airborne urban particulate air.¹¹⁵

- 5.33** Recommendation (7) of the previous Inquiry was that the Government should take a lead role in work being undertaken by the National Environment Protection Council in developing a national air standard for PM_{2.5}, the finer particles less than 2.5 microns in size. The Environment Protection Authority advised¹¹⁶ that the NSW Government has had a fairly strong involvement in this whole process. The Department of Health and EPA supported by the RTA have been involved in the Commonwealth process.
- 5.34** In submission to the Inquiry, the Rockdale City Ratepayer's Action Group referred to the NEPC Annual Report 2000-2001 and the summary of jurisdictional implementation activities contained within that document. The submission highlighted, among other things, the action taken by Victoria to fund a mobile air monitoring laboratory to identify local 'hot spot' areas and design effective local air quality improvement actions.¹¹⁷
- 5.35** Some members of the Committee raised the issue of timeframes, noting the gap between the identification of a need and the implementation of a standard to address it.¹¹⁸ The Acting Director General of the EPA, Mr Joe Woodward, explained the process to the Committee:

First of all, there was Commonwealth and then complementary State legislation introduced to all Governments around Australia to actually implement this. The whole process for developing a measure is quite complicated and takes a while because it involves a declaration to determine a measure, then a draft paper, an issues paper in essence on it, public comment with public involvement, a draft measure, further public involvement and then adoption of it and translation to the various jurisdictions to implement it...

It recognised that there was a concern about finer particles as well and the council has embarked on a process for gathering information and trying to develop a standard for PM_{2.5}s as well and that is what led to the current discussion paper that is out at the moment with a draft measure and the draft measure, as I have said, at this stage suggests a reporting standard rather than a standard that has to be met because of the concern about insufficient information being available and that is subject to public discussion at the moment. There was a public workshop in Sydney last month and there will be another one later this month and then that closes off, so comments need to go back to the Commonwealth and that will be considered again, on my understanding, somewhere around April or so next year..¹¹⁹

¹¹⁵ Morawska, *Submission No.95*, p1.

¹¹⁶ *Evidence*, 15 November 2002, p31.

¹¹⁷ Rockdale City Ratepayer's Action Group, *Submission No. 74*, p6.

¹¹⁸ Woodward, *Evidence*, 15 November 2002, p37.

¹¹⁹ Woodward *Evidence*, 15 November 2002, p 42-43.

- 5.36** The proposed standard is that particles as PM_{2.5} for twenty-four hours exposure must be less than 25 micrograms per cubic metre. Over a one-year period this exposure must be less than eight micrograms per cubic metre. The standard is to apply only at monitoring stations. That is stations that represent the general exposure of the population to the particles.
- 5.37** Dr Peter Manins advised the Committee that the annual value of eight micrograms will be rather difficult to meet in NSW; while the 24-hour value could well be met, depending on bushfires and brief events.¹²⁰

Conclusion: PM standards and health

- 5.38** The Committee notes the increasing concern of the scientific community regarding the effects of PM_{2.5}. This concern is in part reflected in the low proposed national standard reporting measures. The obvious concern for local residents is that they are experiencing the ill-effect of particulate emissions now, while these standards are still being developed.
- 5.39** As noted in paragraph 5.32, even while consideration is currently being given to the introduction of a PM_{2.5} standard, the scientific community has identified that further modification to eventually include introduction of a PM₁ standard might also be considered. The long lead-time between the identification of a need and the implementation of a standard to address it was also noted earlier. Given that the smaller the particles the higher the likelihood of penetrations of the particles to the deeper parts of the respiratory tract, it appears appropriate to now fully consider whether any new standard should be set below PM_{2.5}.

Recommendation 4

The Committee recommends that the NSW Government adopt a lead role and take a proposal to the National Environment Protection Council to commence the process for the development of a national air quality standard for PM₁.

MMT Health impacts

- 5.40** A new additive for lead replacement petrol called MMT which is magnesium based was introduced in January 2002. The Committee received evidence¹²¹ from Dr Peter Best on this issue. Additional evidence was given to the Inquiry on 18 November:

The Hon. AMANDA FAZIO: We heard some evidence on Friday from Dr Best, who also does air quality measurements, about potential causes for changes to air quality since the tunnel has opened, and he mentioned the change to Sydney

¹²⁰ Manins, *Evidence*, 18 November 2002, p32.

¹²¹ See transcript of evidence 15 November 2002, p16.

fuel specifications that came in January 2002, when some manganese based substance called MMT was added to lead replacement petrol. Have you got any comments on that, whether you think that would be contributing in any way or whether that is just a side issue that has an impact?

Dr HOLMES: I think it is unlikely. I have not looked at that aspect myself, but I know it is something which was widely used in Canada, and I know just from a brief reading that some of the effects that people are describing are not inconsistent with the respiratory effects that the compounds in petrol would have, but I do know what the concentration is in petrol. I think it is unlikely. That is my professional opinion, but it is not based on any measurements that I have made or any, I guess, real assessment data.¹²²

- 5.41** The impacts of the changes to Australian Fuel Standards by the introduction of MMT as a fuel additive for lead replacement petrol have not been investigated. This change was introduced concurrently with the opening of the M5 East tunnel and the reported health impacts of MMT are similar to those reported by local residents. Due to a lack of evidence, it is not possible to determine if MMT has contributed to the health impacts being reported as attributable only to the opening of the tunnel. Given the high levels of concern expressed in North America about the toxicity of MMT it is recommended that the Federal Government be requested to conduct an inquiry into its' safety and use.

Recommendation 5

The Committee recommends that the Federal Government undertake an inquiry into the safety and use of MMT as a fuel additive.

Portal emissions

- 5.42** Public concern has been raised about the consideration being given to sanctioned portal emissions. Dr Manins was asked to postulate, on the basis of the local terrain, the area that would be affected should portal emissions ever commence as a standard practice:

One of the problems is that the eastern end of the tunnel has a 1 in 12 grade right at the portal and that means that the diesel vehicles, the bigger vehicles, are all running at full load as they exit that tunnel. They are all operating at full emissions. At the eastern end I guess I would expect, if there were portal emissions, a rather substantial impact of many portal diameters around the portal. At the western end there is a 1 in 12 grade, but it is actually outside the tunnel and that means that the maximum emissions are already occurring from the vehicles individually just outside the tunnel at the western end. Portal emissions would add to that, but the gradient is less and therefore the emissions would be less just inside the tunnel. Again, many portal diameters would be affected.¹²³

¹²² *Evidence*, 18 November 2002, p56.

¹²³ Manins, *Evidence*, 18 November 2002, p34.

5.43 The tunnel operators were examined on the question of whether a programme of regular portal emissions was being planned:

The Hon JOHN JOBLING: ...Are you saying to me that you are now working on the basis of being able to use portal emissions at the four portals?

Mr TUCKER: Portal emissions are provided for in response to incidents and select maintenance activities.

The Hon JOHN JOBLING: So there is no program or proposition that you have, ...in relation to how you might do it on a regular basis?

Mr TUCKER: Not at this stage.¹²⁴

5.44 Mr Paul Forward, CEO, of the RTA advised the Committee that any decision for portal emissions during normal operations would be a decision for PlanningNSW:

The Hon JOHN RYAN: Are you saying to the Committee that the RTA is not considering or studying portal emissions as a means of normal operations of the tunnel?

Mr FORWARD: As I said, as part of the arrangement with DUAP, during an incident, portal emissions are allowed for that short period.

The Hon JOHN RYAN: What about during the normal operations of the tunnel?

Mr FORWARD: As I said before, that is not up to the RTA to decide.

The Hon JOHN RYAN: Are you working towards having that standard changed?

Mr FORWARD: That is not up to us, that is up to the Department of Planning.¹²⁵

5.45 During the public hearing, the RTA was asked to consider a tabled document that contained RTA comments on a study conducted by Hyder Consulting on portal emissions. RTA annotations on the draft study included:

The draft needs careful rewording to clarify that our first objective is to verify that existing partial and full portal emissions have no adverse impact on nearby receptors and only then can we consider further use of portal emissions as part of normal tunnel operations. If there is to be any proposed change to condition 71, it will require full community consultation and at least an REF....¹²⁶

¹²⁴ Tucker, *Evidence*, 18 November 2002, p 9.

¹²⁵ *ibid*, p 28.

¹²⁶ *ibid*, p 28.

5.46 The RTA advised that no further action was being taken with respect to the study:

The Hon JOHN RYAN: Are you studying at the moment a proposal to use portal emissions for anything other than absolute and utter emergencies within the tunnel?

Mr GALLACHER: The answer is a simple no.

The Hon JOHN RYAN: What is the explanation for the paperwork I have just handed to you, which appears to be that very thing?

Mr GALLACHER: We have an obligation under 73/8 to investigate portal emissions. We were looking at those investigations, but they have ceased.

The Hon JOHN JOBLING: No further action has been taken?

Mr GALLACHER: No.¹²⁷

5.47 The Committee notes that when asked these questions under oath witnesses have generally given qualified responses. The Committee understands from the answers given on 18 November 2002 that the RTA was not considering expanding the use of portal emissions, even though this has been investigated in the recent past. There are no guarantees as to what might occur in the future, especially if current in-tunnel problems continue (see below). The uncertainty as to portal emissions only highlights the need for the Government to reconsider its refusal to contemplate filtration.

Health impacts inside the tunnel

5.48 The most striking aspect of this current Inquiry is how the focus of controversy and concern has shifted to in-tunnel air quality. While the health impacts on local residents continue to be a major concern, the numbers of people affected are small compared to the potential health risk posed by in-tunnel pollutants, given over 80,000 motorists are currently using the tunnel daily and already eight exceedances have been recorded.

5.49 In a tunnel setting, pollutant levels may reach much higher levels than usually found near roadways. Key motor vehicle pollutants of concern to NSW Health are fine particles, carbon monoxide, nitrogen dioxide, benzene and other organic compounds.¹²⁸

5.50 Dr Manins of the CSIRO was asked his opinion, given the high level of fine particle pollutants, of the 'healthiness' of the tunnel environment:

Dr MANINS: It is a most unhealthy place clearly and people who actually work in that tunnel are at substantial risk.

CHAIR: Earlier Mr Paul Forward said it was a breathable atmosphere inside the tunnel.

¹²⁷ Gallacher, *Evidence*, 18 November 2002, p 28-29.

¹²⁸ Stewart, *Evidence*, 18 November 2002, p41.

Dr MANINS: I understand Nick Greiner is quoted in the press¹²⁹ as saying that. I presume you can get some oxygen out of the air at the same time as you breathe in and out.¹³⁰

Traffic volume and tunnel design

- 5.51** There is no question that the M5 East roadway has been successful in terms of patronage and of significantly reducing congestion on local roads. The Committee heard evidence from engineering consultant Mr Noel Child, that this success might be a contributor to the problems being experienced with in-tunnel air quality:

I think the tunnel in a sense is a victim of its own success, in that it has opened with a substantially higher traffic volumes than were projected and for which the system was designed, and it has brought with those higher traffic volumes the characteristics of today's engines and today's fuels....There would be an argument that the tunnel was opened with 2012 traffic levels and 2002 fuel and engine quality considerations. What I say is not by way of overt criticism of those who designed the tunnel, but I think it reflects a reality that air quality within the tunnel does present a problem.¹³¹

- 5.52** During the assessment of the M5 tunnel, NSW Health acknowledged that it seemed likely that during high traffic flow periods motorists would be in the tunnel for longer than the normal six to seven minutes for transit time.¹³²

- 5.53** The President of Residents Against Polluting Stacks highlighted to the Committee that it was important to consider that the Inquiry was dealing with a project whose concept was laid down in the early 1990s, a concept, when realised in the year 2002, is carrying year 2010-plus traffic.¹³³

- 5.54** The tunnel ventilation design reflects the change from three ventilation stacks to one. Critics have identified this as a fundamental flaw in the design. Mr Child provided his view to the Committee:

...But what does appear to be happening within the tunnel is that there seems to be a difficulty, or a near difficulty, in reaching benchmark levels of carbon monoxide and I suspect that that is because the tunnel design, which I think introduced the single stack model in an attempt to deliver a traffic outcome and find some solution to competing controversies about how this thing should be designed, in simple terms the tunnel as it stands calls for the air to be literally turned around at one of the two parallel tunnel tubes and redirected down the other. That is a high energy option, a high demand option, and I would simply say and I will return to it a little later, that I am sure if those designing the tunnel had their druthers, they would design it, and I think this has implications for future

¹²⁹ *Sydney Morning Herald*, "Hazy tunnel vision harmless", 18 November 2002.

¹³⁰ Manins, *Evidence*, 18 November 2002, p 36.

¹³¹ Child, *Evidence*, 15 November 2002, p 22.

¹³² Stewart, *Evidence*, 18 November 2002, 42.

¹³³ Briers, *Evidence*, 18 November 2002, p61.

tunnels, such that each of the two tunnel tubes was in the most efficient way possible longitudinally ventilated through the separate stacks....¹³⁴

5.55 Mr Child confirmed his view on the design considerations in the simplest terms possible:

That is why two stacks are better than one all else being equal.¹³⁵

5.56 A September 2002 PlanningNSW document titled: "Report on in-tunnel air quality issues relating to the operation of the M5 East", which was tabled during the Inquiry, recommends with respect to other proposed tunnels:

... a more strategic study be undertaken into better understanding the design of tunnels and in particular the relationship of the design to air quality outcomes (both short term and longer term guidelines), relationship to fire/safety issues and the degree of risks/contingency built into the design and potential construction and costs impacts of improvements.¹³⁶

5.57 PlanningNSW indicated to the Committee that it, at least, had indeed learned from this experience:

The Hon JOHN RYAN: ...Is it appropriate that some standard needs to be set for that tunnel, or some other, with regard to what appears to be a pretty obvious environmental problem and to some extent, as I understand it, this particular tunnel is unusual in that it is quite long by world standards and it is ventilated at one point, and that does appear to give special reasons for that being a particular concern and there being a need for a response from a regulator.

Mr HADDAD: I agree that, irrespective of the conditions and any specific requirements, it is obvious that conditions within that tunnel are not, I suppose, pleasant, in a sense, broadly speaking, relevant to any other tunnel and it is a matter that we have brought consistently to the attention of the RTA and others. We have been following it; we have been asking questions; we have been looking at what can be done to address it. We have been learning a lesson from it in terms of assessing future tunnels and seeing how we can prevent that. As a minimum, including any potential impacts and so on, the first thing as professionals that we need to do is to stop and look at how we can prevent it in any other piece of infrastructure, but nevertheless, in terms of the M5 tunnel, we have been consistently following it with the RTA to see what can be done, what should be done in terms of improving the broad conditions, irrespective, I must say, of complying with CO conditions, whether we should look at particulate standards or any other standards. You are right, it is not an easy matter in terms of specific conditions applicable to that tunnel and you are absolutely right that at the time of our assessment our attention was on external environmental conditions because we were very much concerned about the community, community concerns expressed to us consistently, and rightly so, about external conditions and probably there should have been much more done in relation to the internal

¹³⁴ Child, *Evidence*, 15 November 2002, p 23.

¹³⁵ Child, *Evidence*, 15 November 2002, p26.

¹³⁶ Document dated 2/9/2002, tabled by Giselle Mawer, 18 November 2002.

conditions. That is a lesson that we have learned in terms of our assessment of future tunnels, as will be evident in due course.¹³⁷

- 5.58** The Committee is encouraged that PlanningNSW is learning from its experience in regulating the M5 tunnel, but also notes the comments of RAPS representative Peter Sapios that local residents were the “guinea pigs” in this process.¹³⁸

Visibility as an indication of health risk

- 5.59** A feature of the M5 tunnel that has attracted comment since the commencement of operation has been the visible ‘haze’ within the tunnel. Ten, non-local, individuals were compelled by their experience of simply driving through the tunnel to make written submission to the Inquiry. Examples of submissions of this nature include:

As a regular user of the M5 East tunnel, I am totally appalled by both the visible air pollution and the toxic smell of the fumes experienced during travel through the tunnel.¹³⁹

And

The air quality in the tunnel is bad. Even at its least haziest I am forced to put my windows up because if I didn't I could still smell the petrol/benzene exhaust fumes. At its worst I need to close the car's air inlet vent as well and put the air conditioning on. Otherwise I begin to taste the contaminated air down the back of my throat and physically react to the fumes finding it impossible to breathe.¹⁴⁰

- 5.60** During the public hearing the Committee was initially advised by the operator of the tunnel that:

...The visible smog in the tunnel is well below health minimums and is not a measure of unsafe air quality....¹⁴¹

- 5.61** The RTA's design specification for the M5 East imposed a visibility criterion based on the applicable PIARC (Permanent International Association of Tunnel Congress) guideline. The intention of these guidelines is to ensure that visibility is sufficient to allow vehicles to stop safely if required within the M5 East tunnel.

- 5.62** The PIARC guidelines express visibility by reference to the ‘extinction’ coefficient K. the PIARC recommended levels are as follows:

$K = 0.005\text{m}^{-1}$ means clear tunnel air (visibility of several hundred metres)

$K = 0.007\text{m}^{-1}$ means a light haziness of the tunnel air

¹³⁷ *Evidence*, 15 November 2002, p 49.

¹³⁸ Sapios, *Evidence*, 18 November 2002, p73.

¹³⁹ Tucha D, *Submission No. 9*, p1.

¹⁴⁰ Schiavello J, *Submission No. 12*, p1.

¹⁴¹ Greiner *Evidence*, 18 November 2002, p 2.

$K = 0.009\text{m}^{-1}$ means a foggy impression.

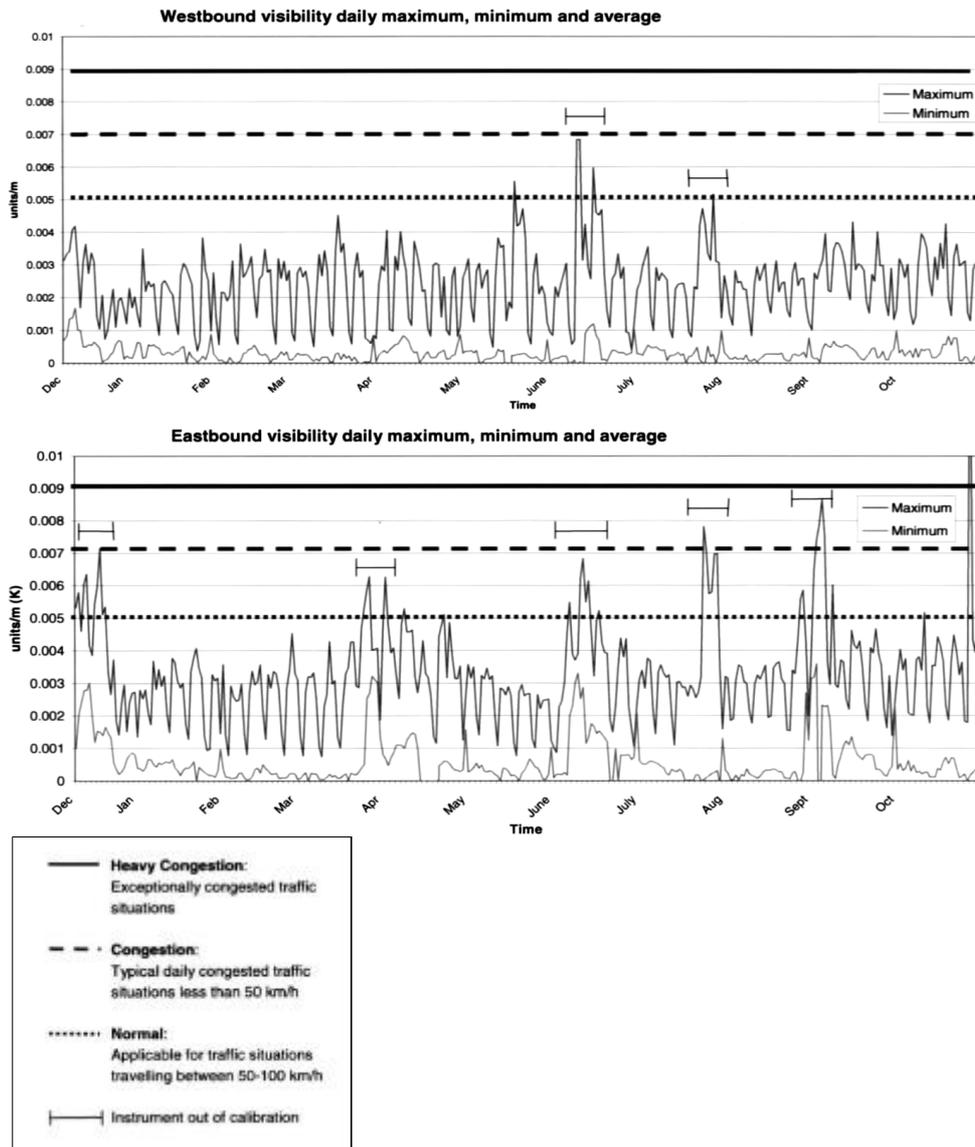
5.63 The RTA advised that

Even with $K = 0.012\text{m}^{-1}$ which PIARC describes as a “most uncomfortable atmosphere”, there is normally enough visibility for a safe car stop in front of an obstacle.

The M5 East generally experiences values of K below 0.005m^{-1} (clean tunnel air with visibility several hundred metres) and has recorded a maximum value of $K = 0.0068\text{m}^{-1}$ during normal operation. Therefore, the M5 East is being operated in accordance with the PIARC guidelines on visibility.

5.64 The RTA also advised that the visibility specification was a traffic safety criterion and not a health criterion.¹⁴²

Figure 5.2: In-tunnel visibility reading



142 Roads and Traffic Authority, *Submission No. 85*, p13.

5.65

Figure 5.2 provides a graphic representation of the tunnel's performance according to the PIARC guidelines. These figures were provided by Boulderstone Hornibrook as part of its submission to the Inquiry. During the public hearing the conversion of the visibility measurement to particulate concentration was examined:

CHAIR: On page 10 of your submission you talk about visibility. Are you aware of the formula which would convert that visibility in micrograms per cubic metre?

Mr BURRELL: Yes, I am.

CHAIR: Could you tell me then what .005 converts to in micrograms per cubic metre?

Mr BURRELL: I would suggest approximately – and it depends – 1000 micrograms per cubic metre.

CHAIR: Do you know what the ambient air standard is outside the tunnel?

Mr BURRELL: Yes, I do.

CHAIR: What is that?

Mr BURRELL: For particulate matter of PM₁₀, 50 micrograms per cubic metre, 24-hour average.

CHAIR: The air inside the tunnel is 50 times the ambient quality outside.

Mr BURRELL: That would be a fair statement.

CHAIR: So if you were to take seven minutes to go through the tunnel, and seven minutes back, what would that average throughout the day for your intake of particulate matter?

Mr BURRELL: May I ask: Is it on an exposure basis that you are asking that question?

CHAIR: Yes.

Mr BURRELL: Well assuming the in-tunnel average is, let's say it is peak for the sake of argument, 1000 micrograms per cubic metre, if one was exposed making two trips a day, each way, let's say 12 minutes, because at 20 kph you would travel the four kilometres in 12 minutes, at that level you would have an exposure of, say, 24,000 microgram minutes. External air quality goal, if you are treating it as an exposure basis, gives you 72,000 microgram minutes. There is a residual for each motorist making that type of trip of approximately, say, 46,000 to 50,000 microgram minutes, which in turn equates to an external average PM₁₀ level of around 30 micrograms per cubic metre, so I would suggest that on an exposure basis, assuming that that was the appropriate way to assess the health risks in-tunnel associated with PM₁₀ or particulate matter, that does not demonstrate a motorist is exposed beyond the external air quality goal.

CHAIR: During that time alone, if they have no further exposure during the other 23 and a half hours?

Mr BURRELL: No, there is a residual. Even after making those two journeys there is still a residual with which they may be exposed externally.¹⁴³

5.66 However, using the figures from the above example a motorist who made multiple trips per day, for example a taxi driver, would reach their daily exposure after six trips through the tunnel.

5.67 Using a more conservative approach of an average tunnel reading of 0.0035 and a trip duration of seven minutes would result in 4900 microgram minutes per trip. It should also be noted that the haze is 'predominantly particulate matter caused by emissions from diesel vehicles'¹⁴⁴ and therefore would be PM_{2.5} and less.

5.68 The use of the visibility measurement as an indication of health impacts was raised with Dr Manins of the CSIRO:

Dr MANINS: ... they are generally not directly measuring mass of particles, they are measuring a light scattering, a light scattering method, so there would be some argument about the precise number, but we are only talking 10s of percent at the most, but the point is quite strong that the levels are very high in the tunnel.

CHAIR: Do those figures make sense, broadly speaking, to you?

Dr MANINS: Yes they do.

CHAIR: It strikes me that it is such a high level inside the tunnel that, if people have to go through that on a daily basis, they would have a very high exposure....

Dr MANINS: Yes, I would agree with the estimates that you have made. It is not clear what the consequence of that exposure is, so there needs to be some consideration of that. The exposure is brief, yet the evidence that we have that forms the basis for the air quality standards I talked about before is 24-hour average exposure. It is not clear from the data used to derive those relationships, those epidemiological relationships, how a narrow spike, a spike of 10 minutes' exposure once a day, would relate to the 24 hour average that might be Sydney-wide..¹⁴⁵

5.69 NSW Health was also questioned about the relationship between short term exposure and daily average goals. A discussion ensued on the averaging of exposures for entire populations when setting goals. In response to the proposition that the discrete population of regular tunnel users would be increasing their daily exposure, NSW Health outlined their approach:

Dr CORBETT: ...If we are actually looking at this issue on the basis of preventing high exposures the critical issue for us to examine, from a health perspective, is whether the net number of people are going to be reduced. We also know we can reduce individual exposure by orders of magnitude, by simple measures such as closing windows and closing vents of cars. It is not a simple

¹⁴³ Burrell, *Evidence*, 18 November 2002, p 3.

¹⁴⁴ Burrell, *Evidence*, 18 November 2002, p 7.

¹⁴⁵ Manins, *Evidence*, 18 November 2002, p 33.

equation that travel through the tunnel is going to have a net increase on the number of people exposed to high levels of pollution.

Dr STEWART: We are not saying levels in the tunnel should not be reduced, we have not said that. We are saying if you start with an analysis based on whole populations, when you change exposures you have to analyse on whole populations. One of the issues is: What do the kind of levels you talked about earlier mean in terms of short exposure? We cannot answer that. I am doubtful anyone in the world can answer that, but it is not correct to say the department is not concerned about reducing levels of exposure to people within that tunnel -- of course we are.

CHAIR: How do you propose that be done?

Dr STEWART: ...In terms of the tunnel itself, there are issues about ventilation – in fact it is probably reasonable to take an ordinary health approach to this, which is about the vehicle, about the person and the environment. There are ways to do that in all three areas.¹⁴⁶

5.70 The view that the impact of the tunnel *might* be compensated for by the impact of travelling on a freeway was put to the Committee:

Dr CORBETT: I think it is also important to ask ourselves the question: Is the exposure over the journey of people using this mode of transport more or less now than what it has been before? That is the critical issue in terms of individuals, and there may be an argument that there is some compensation travelling on a freeway. Now I think that is unproven, we do not really know the answer to that question, but I am just concerned about the simple assumption that travelling through this tunnel increases the exposure of individuals or groups in the way that has been portrayed.¹⁴⁷

5.71 The Committee notes that standards have to be set and then measured on net population figures. Nevertheless, a daily multiple-trip tunnel user would have to be increasing their net daily exposure, all other factors being equal. In the absence of contrary evidence, the Committee believes the highest priority needs to be given to assessing the health risks and impacts on the tens of thousands of motorists using the tunnel every day. The study by NSW Health of in-tunnel impacts (see previous chapter) is very timely.

Warning signs

5.72 In evidence Mr Child outlined a potentially harmful action that drivers could unwittingly take when using the tunnel:

I put the hypothetical someone entering that tunnel from the western side heading east in a modern car which is virtually airtight but with the air-conditioning events open, gets a few hundred metres into a point of peak carbon monoxide — because these things peak and trough inside the tunnel with ventilation gradients

¹⁴⁶ *Evidence*, 18 November 2002, p 43.

¹⁴⁷ *Corbett Evidence*, 18 November 2002, p 46.

and so on; fills their car with gas at the worst point, says, "That stinks" and shuts the vents off, they are operating with that in-car air beyond the tunnel...¹⁴⁸

5.73 The CEO of the Roads and Traffic Authority, Mr Forward, was questioned on the Authority's position regarding issuing warnings to motorists regarding safe or precautionary practice when using the tunnel.

The Hon. JOHN JOBLING: Have you put up any warning signs at the entrance to the tunnels or the on-ramps suggesting motorists wind their windows up or turn off their outside air-conditioning?

Mr FORWARD: As I say we meet the standards in the tunnel this is a decision for the motorist.

The Hon JOHN JOBLING: No that is a very simple question, have you put up signs?

Mr FORWARD: No we have not, no.

The Hon JOHN JOBLING: I have a document from the Public Protection Environmental Health Branch dated 25 February 2002 that states:

Discussions with the EPA have highlighted a number of concerns of both health and EPA related to issues related to in-tunnel air quality and it is proposed these issues will be raised with the RTA at the meeting tentatively scheduled for 28/2/02. RTA advice that motorists close their windows and air vents while in the tunnel is reasonable.

Obviously in those days you were expressing some reason for motorists to wind up their windows and turn off the air-conditioning air vents while in the tunnel.

Mr FORWARD: Can I ask what the question is?

The Hon JOHN JOBLING: I am trying to find out why you have not put up warning signs when you expressed a view that the RTA advice to motorists to close their windows and air vents while in the tunnel is reasonable? Health agrees with you; I'm wondering why it has not happened?

Mr FORWARD: As I say, the standards are met in the tunnel. We have not provided particular advice to motorists. That is their decision as they go through the tunnel.¹⁴⁹

5.74 Despite this view, the Committee was advised by a RAPS representative that the RTA had previously produced pamphlets on using the M5 Tunnel which included the advice to drivers to remove their sunglasses before entering the tunnel.¹⁵⁰

¹⁴⁸ Child *Evidence*, 15 November 2002, p 24.

¹⁴⁹ Forward, *Evidence*, 18 November 2002, p 25.

¹⁵⁰ Mawer, *Evidence*, 18 November 2002, p73.

- 5.75** Chapter Four contains an examination of the in-tunnel study being conducted by NSW Health. That study is being funded by the RTA. An aim of the study is to provide information on which to base advice for motorists of means to reduce pollutant exposure while using the tunnel.
- 5.76** NSW Health advised that an individual's exposure to pollutants can be reduced by orders of magnitude by simple measures such as closing windows and closing vents of cars.¹⁵¹ This point was reinforced to the Committee during evidence:
- CHAIR:** Would you recommend motorists using that tunnel carry facemasks in case they breakdown?
- Dr STEWART:** No we do not recommend anything at the moment. We are doing this study to find out more things. We do recommend prudent avoidance, it is an ordinary principle applied across a range of environmental areas. We do say you should wind your windows up. We are surprised people do not wind their windows up; we are surprised people do not turn their engines off when they have stopped.¹⁵²
- 5.77** The Committee notes the advice from NSW Health that it recommends motorists prudently avoid unnecessary exposure to the tunnel environment. The RTA advised that it is a motorist's choice to close or open their windows. While this is true, such choices are best made with some understanding of the potential consequences. Until the conclusion of the NSW Health study the precautionary principle should prevail.

Recommendation 6

The Committee recommends that, at least until the conclusion of the NSW Health in-tunnel study, the RTA erect signage to advise motorists that it is recommended that they close their windows and air vents prior to entering the tunnel.

In-tunnel standard for particulate matter exposure

- 5.78** The Environment Protection Authority (EPA) advised that it has been working with NSW Health, Planning NSW and the RTA in relation to appropriate goals and approval conditions for in-tunnel exposure. However, in relation to fine particles the EPA is not aware of any suitable short-term goal that could be applied to in-tunnel levels of particulate matter.¹⁵³

¹⁵¹ Corbett, *Evidence*, 18 November 2002, p45.

¹⁵² Stewart, *Evidence*, 18 November 2002, p 48.

¹⁵³ Woodward, *Evidence*, 15 November 2002, p 33.

5.79 As stated earlier the proposed NEPC reporting standards for PM_{2.5} will be a 24-hour average of 25 micrograms per cubic metre and an annual average of 8 micrograms per cubic metre. In this context, the concentration of PM_{2.5} within the tunnel was raised with the EPA:

CHAIR: ...What I would like to know is what percentage of PM_{2.5s} is of PM_{10s} because there is no breakdown now of the ambient air quality from the stack, of course.

Mr EISER: ...It ranges from about .2, so 20 percent of the PM₁₀, to about 90 percent of the PM₁₀ and over the whole year on average it is about 50 percent of the PM₁₀ level.

...

CHAIR: ...Do we know whether the PM_{2.5} and below is a higher percentage in diesel exhaust?

Mr EISER: In terms of diesel, we understand that the bulk of the particles emitted from diesel are less than PM_{2.5}, and certainly more than 90 percent less than PM₁, so they are the very, very fine particles, size range.

CHAIR: So we might assume then that the PM in the tunnel, which is clearly visible to people driving through it, would have 90 percent PM_{2.5} which would be of much greater risk than if actually PM₁₀.

...

Mr EISER: Inside the tunnel you would have to look at some monitoring to see the ratio between the two, but we would expect the particles in the tunnel to be in the very fine fraction.¹⁵⁴

5.80 The need for investigation of in-tunnel standards was then raised with the EPA:

CHAIR: Do I take it that the EPA will be working on in-tunnel standards or some in-tunnel measurements [for particulate matter] because it seems to be a great big black hole right now? We have this ambient air quality and we have nothing for in-tunnel whatsoever.

Mr WOODWARD: We certainly are, and we are at the moment particularly interested in the information that will come out of NSW Health from the work that they are doing on the in-tunnel exposure of people and that is looking at the total health impact on people because, in essence, that is what people are particularly concerned about, the impact on them. Regardless of what the standard is, they are concerned about the impact on their health, and that is what the Health work is actually targeting at the moment.¹⁵⁵

¹⁵⁴ Eiser, *Evidence*, 15 November 2002, p35.

¹⁵⁵ Woodward, *Evidence*, 15 November 2002, p 39.

5.81 This issue was also raised with PlanningNSW:

CHAIR: I really think that the Department of Planning, working with the Department of Health and the EPA, needs to look very seriously at the problem of the particulate matter within the tunnel, not just carbon monoxide which is being addressed, but there is a great big black hole when it comes to particulate matter in the tunnel which has not been addressed.

Ms HOLLIDAY: We will take that on board.

The Hon. JOHN JOBLING: It is a major concern, particulate matter less than 10, and you get a cocktail of 2.5 down to .1 and less. It is accepted medically that there are potentials of carcinogens and I suggest that what in fact you potentially have is the basis of what many workers in the asbestos industry many years ago had. It didn't hurt you much once, but if you go through twice a day five days a week, at the end of a period of time, is there the potential for mesothelioma from this? I would support the Chairman in suggesting that this should be looked at urgently because particulate less than PM₁₀, and its long-term cumulative effect in deep lung therapy, once it is there does not come out easily. Might I suggest that you should insist, as a matter of course, that this should be undertaken urgently?

Ms HOLLIDAY: I have indicated that we will take that on board.¹⁵⁶

5.82 Dr Manins, suggested that occupational health and safety limits could provide a minimum guideline for the development of any short term standard:

The Hon. JOHN RYAN: We know there are no goals set for the tunnel with regard to short-term exposure to high concentration of particulate matter. Are there relevant standards that might be applied for short-term exposure to high concentrations of particulate matter?

Dr MANINS: Yes I believe the occupational health and safety limits are the minimum one could expect to apply. I am unaware of what the occupational health and safety level is but that would have to be the minimal acceptable standard preferably because the general public is being exposed, one would go for a lower maximum than the occupational health and safety standards. Occupational health and safety standards are probably several hundred micrograms per cubic meter. I am informed of that.¹⁵⁷

Conclusion: in-tunnel standards

5.83 The Committee recognises that PM_{2.5} is still a developing area of knowledge and that national standards, while on the way, are some way from being established. However, given the existing tunnel projects being considered by the Government there is a need for PlanningNSW, in consultation with the EPA and Health to develop guidelines to assist it in future conditions of approval. If it fails to do so, a national standard, once reached, will be of little value if approval conditions have made no provision for implementation of this standard.

¹⁵⁶ Holliday, *Evidence*, 15 November 2002, p 54.

¹⁵⁷ *Evidence*, 18 November 2002, p 37.

Recommendation 7

The Committee recommends the Environment Protection Authority immediately commence investigation and monitoring of the levels of particulate matter of size PM_{2.5} and below within the M5 East tunnel.

Recommendation 8

The Committee recommends that as a matter of urgency, while national standards are in the process of being developed, the Environment Protection Authority in consultation with NSW Health and PlanningNSW develop guidelines on PM_{2.5} that must be considered when setting conditions of approval for road tunnel construction.

Occupational Health & Safety Requirements

5.84 PlanningNSW noted that with respect to tunnel operators there are statutory Occupational Health and Safety requirements that go beyond the conditions of approval and are not the direct responsibility of Planning NSW to enforce.¹⁵⁸

5.85 In a discussion about in-tunnel air quality and exposure and their in-tunnel study, NSW Health referred to the obligation of the RTA, and by extension BHEgis, to provide a safe environment for their workers:

Dr STEWART: ... I emphasise though we are talking about the general public and general public exposure. Issues about the occupational health and safety of RTA employees are for RTA to deal with not health. We can provide advice about health effects and so on.¹⁵⁹

...

Dr CORBETT: ... Secondly, as far as occupational health and safety, this is a matter for the RTA but as with all respiratory hazards there is the option of using personal respiratory protection for people who are exposed in the workplace. That is a risk-management option, which I am sure is part of the suite of things that will need to be considered.¹⁶⁰

¹⁵⁸ PlanningNSW, *Submission No. 84*, p9.

¹⁵⁹ Stewart, *Evidence*, 18 November 2002, p48.

¹⁶⁰ Corbett, *Evidence*, 18 November 2002, p 48.

The Occupational Health and Safety Act & Regulation 2001

- 5.86** This amending Act and Regulation came into effect from 1 September 2001. It requires employers to identify hazards and to eliminate or control risks at the employer's place of work.
- 5.87** Clause 17 of the Regulation requires that an employer must ensure that, in the event of an emergency at any place of work at which the employer's undertaking is conducted, arrangements must be made for the safe and rapid evacuation of persons from the place of work.
- 5.88** Clause 51(1) requires that an employer must ensure that no person at a place of work is exposed to an airborne concentration of an atmospheric contaminant that exceeds or breaches a standard referred to in or determined under subclause (2). Subclause 2 provides that the standard for atmospheric contaminants other than chrysolite or synthetic mineral fibre dust is as determined in accordance with the documents entitled "Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC: 3008]" and "Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC: 1003]", as amended from time to time by amendments published in the Chemical Gazette of the Commonwealth of Australia.
- 5.89** Clause 55 relates to the monitoring of atmospheric contaminants, the need for which may be identified during the risk assessment of a place of work.
- 5.90** The Chief Executive Officer of the Roads and Traffic Authority advised the Committee that it satisfied all Occupational Health and Safety requirements with respect to its employees who regularly worked within the tunnel.¹⁶¹
- 5.91** The Operations and Maintenance Manager, BHBB, was questioned on the monitoring that take place inside the tunnel:

CHAIR: Do you monitor for benzene, a class 1 carcinogen?

MR TUCKER: No, it is not a requirement.

...

CHAIR: Would it not be incumbent upon you to have a duty of care to your employees not to expose them to unsafe levels of benzene, formaldehyde and particulate matter?

MR TUCKER: Indeed the health and safety of all workers and motorists is of paramount importance to us.

CHAIR: Yet you do not measure for these dangerous gases inside the tunnel?

MR TUCKER: No we do not measure on an ongoing basis.

¹⁶¹ Forward, *Evidence*, 18 November 2002, p15.

CHAIR: Do you not think it would be a good idea for the occupational health and safety of your employees to make sure they are not exposed to high levels of benzene, formaldehyde and particulate matter particularly PM_{2.5s}.

MR TUCKER: There is a study being conducted on a short-term basis to understand it in relation to peak periods. Those results are not available.¹⁶²

5.92 The same question was also put to the Chairman:

CHAIR: ...As chairman of this company I would have thought it was incumbent upon you to make sure conditions for your employees within the tunnel were safe...

MR GREINER: I accept what Mr Tucker says that clearly the safety of our employees has to be a primary concern of the company. I would imagine, although I do not know first-hand, we do everything required of us by law and if there is more required... If at some future time that is considered required or desirable we would obviously do it. I do not think there is any suggestion we do other than meet all of the existing OH&S requirements.¹⁶³

5.93 In response to a question taken on notice after the public hearing on 18 November, Mr Tucker provided the following response:

Boulderstone Hornibrook and in particular BHEgis is fully aware of its obligations and responsibilities imposed on it by the *Occupational Health and Safety Act 2000* and the *Occupational Health and Safety Regulation 2001*. Two key documents form the basis of the care, control and management of the tunnel to ensure the health and safety of tunnel users and tunnel maintenance workers. These are:

- M5 East Occupational Health and Safety Plan; and
- M5 East Environment Management Plan.

Both plans are subject to continuous review.

The health and safety of tunnel workers is assured through the implementation of the M5 East Work Permit System which is contained in the OH&S Plan. This system ensures that work which constitutes an environment, safety or health hazard is not carried out without an approved work permit issued by BHEgis. An approved work permit must identify all hazards, precautionary and control measures. These must be observed by all personnel who work in the tunnel.

The Work Permit System specifies a number of measures to manage situations where air quality may be an issue of concern:

- A ventilation plan is implemented in response to an in-tunnel incident requiring attendance by BHEgis workers and/or emergency services;
- Motorists whose vehicles become stationary in the tunnel for prolonged periods are advised to leave the tunnel with an escort;

¹⁶² Tucker, *Evidence*, 18 November 2002, p 5.

¹⁶³ Greiner, *Evidence*, 18 November 2002, p 6.

- General maintenance within the tunnel is scheduled between 9pm and 5am, corresponding to periods of low traffic volumes (and vehicle emissions) or when tunnel closures are put in place. The ventilation of the tunnel is operated such that CO is maintained below the 30ppm 8 hour goal (with a corresponding reduction in other airborne contaminants); and
- All work teams are required to carry gas monitors, which are preset to advise when exposure standards are approached.¹⁶⁴

5.94 On the 15 November 2002, the Committee Chair wrote to Minister for Industrial Relations regarding the terms of reference of the Inquiry and requesting advice on compliance with safety requirements:

Several submissions received from other agencies have indicated that this issue is the responsibility of the WorkCover Authority. Accordingly, could you please advise what occupational health and safety requirements apply to the tunnel operators and whether these requirements have been met to date.¹⁶⁵

Conclusion: Occupational Health & Safety

5.95 The response from the Minister for Industrial Relations was not received prior to the completion of this report. The Committee is not able on the current information to draw conclusions on whether more should be done by the tunnel operators or the RTA to ensure the safety of their workers within the tunnel.

Recommendation 9

The Committee recommends the WorkCover Authority conduct an audit review of the tunnel operators and the Roads and Traffic Authority to confirm compliance with the requirements of the Occupational Health and Safety Act and Regulation and to identify any other action that should be taken to ensure the safety of workers within the tunnel.

¹⁶⁴ Correspondence dated 22/11/02.

¹⁶⁵ Correspondence dated 5/11/02 from the Committee Chair to The Hon J J Della Bosca MLC, Minister for Industrial Relations.

Chapter 6 **Effectiveness of different systems for filtration and treatment of tunnel air**

There has been an on-going debate as to whether electrostatic-precipitators (ESPs) offer an effective filtration system that could be applied to the M5 East. The conclusions drawn by those on either side of the debate are in stark contradiction despite the fact that both sides essentially draw upon the same information.

The arguments both for and against ESPs primarily refer to their level of use overseas. This chapter reviews any recent changes to both the use overseas and the evidence for the effectiveness of ESPs, although a more detailed discussion is contained in the 1999 and 2001 reports of the Committee. The main change during this Inquiry is that the focus of interest has shifted from filtration of the stack for external air quality to filtration within the tunnel to address the difficulties considered in Chapters Four and Five.

Electrostatic precipitators in PlanningNSW conditions of approval

6.1 The M5 conditions of approval set by PlanningNSW include several that relate to electrostatic precipitators:

- Condition 73/3 requires the RTA to prepare detailed Plans and Specifications for the construction of electrostatic precipitators prior to opening the tunnel to traffic.
- Condition 73/4 requires the RTA to install electrostatic precipitators within six months of a direction by the Director General of PlanningNSW, if results from the monitoring system show the stack was responsible for an exceedance of the ambient PM₁₀ goal.
- Condition 74 states that the tunnel ventilation system must make provision, to the satisfaction of the Director-General, for the installation of treatment systems, including electrostatic precipitators and gas treatment systems. Installation can be required if there is an exceedance of air quality goals.
- Condition 79 requires the RTA to examine international developments in tunnel emission treatment systems and report on the outcome of these examinations for five years on an annual basis.
- Condition 70 requires the RTA to implement any reasonable requirements of the EPA which aim to improve in-tunnel air quality.

6.2 It has been pointed out several times during the current Inquiry the contradiction that PlanningNSW have included these provisions regarding installation of ESPs to address external air quality issues while advancing views that these are ineffective for that purpose. For instance in the submission of this Inquiry PlanningNSW state:

PlanningNSW's conclusion essentially remains the same as before. That is, it does not appear that emission treatment systems are internationally adopted practice for control of tunnel emissions to the external environment.¹⁶⁶

Use of electrostatic precipitators overseas for removal of particulate matter

6.3 The growing scientific and medical research on the effects of ultra-fine particulate matter, and the concomitant concern at the concentration of ultra-fine particulates inside the M5 tunnel was examined in Chapter Five. During this Inquiry the Committee again received conflicting advice both in submissions and evidence on the current application of ESPs overseas.

6.4 Electro-static precipitators (ESPs) are used to remove particulate matter from the atmosphere. They have a history of use in the mining and steelworks industries. They are used in road tunnels, most notably in Norway, Japan, South Korea and Austria. ESPs do not operate to remove gaseous compounds such as CO.

6.5 In submission and evidence to the Inquiry the RTA and PlanningNSW both relied upon the annual international survey carried out on behalf of the RTA in regards to trends in using. Mr Paul Forward, Chief Executive, RTA, described this to the Committee:

As part of the conditions of approval RTA is required on an annual basis to survey the world in terms of developments with regard to technology that might affect the operations of the tunnel. We have commissioned most recently Connell Wagner to do that work for us...¹⁶⁷

...Our Connell Wagner report, the tunnel best practice report we are required to do each year, also investigates what is happening overseas and Japan is one of the countries we look at and have continued to look at that since the M5 East was originally reviewed.¹⁶⁸

6.6 The draft of the 2002 Connell Wagner report was referred to in the submissions by both the RTA and the PlanningNSW. The RTA advised:

The review thus far has determined that the effectiveness of emissions treatment systems are unproven, in an operational situation, in making significant reductions in respect of tunnel air pollutants.¹⁶⁹

6.7 The Committee was not provided with a copy of the draft 2002 report. PlanningNSW advised that the findings of the 2002 report are essentially the same as those of the 2001 review.¹⁷⁰

¹⁶⁶ Planning NSW, *Submission No. 84*, p16.

¹⁶⁷ Forward *Evidence*, 18 November 2002, p 19.

¹⁶⁸ *ibid*, p 26.

¹⁶⁹ Roads and Traffic Authority, *Submission No.85*, p16.

¹⁷⁰ PlanningNSW, *Submission No. 84*, p15-16.

6.8 In the GPSC 4 Budget Estimates hearing on 23 October 2002, the Minister for Roads the Hon Carl Scully MP was sceptical as to the level of use of ESPs overseas:

The Hon. CHARLES LYNN: The last time the committee met you advised that filtration technology does not work. Earlier you mentioned that you regard it is a high-tech placebo. I understand that the Japanese are using it and will continue to use it. I also understand that the Koreans are buying new fans for a number of new tunnels under construction. Are you aware of that? If it does not work, why would they do it?

Mr SCULLY: We heard for months that Norway was running all these tunnels with all these electrostatic precipitators: if only we would do what Norway did. I thought okay, let's go and find out. I sent a team there. They have probably more road tunnels than anywhere else in the world, only six of which have electrostatic precipitators or some form of filtration in them, and only one of those is actually used from time to time. The story we were given was extremely inaccurate and what I would probably call mischievous. Suddenly Norway was dropped as an example of why you would use electrostatic precipitators and now Japan is the flavour of the month. If I have to, I will send a team to Japan to find out what the facts are, because if it is anything like the Norway experience, you will probably find that they are not being used either.¹⁷¹

6.9 This view on the lack of use of ESPs overseas was not held by other witnesses in this Inquiry. For instance a submission by engineering consultant Noel Child outlined the detailed use of ESP technology in long tunnels in Japan.¹⁷² The Residents Against Polluting Stacks were critical of the 2001 survey carried out for the RTA under the conditions of approval:

...[It] appears to us to be superficial in its analysis and very partial in its conclusion. It does not attempt to resolve the contradictions that appear. Even within the report there are contradictions, and in fact it does not correctly report its own contents.¹⁷³

...if you look in the back of the Connell Wagner report, although they do not report on it in the main part of the report, there is actually a list there provided by the Japanese of the built tunnels...¹⁷⁴

6.10 The opposing views of proponents and opponents of ESP technology were examined in the report on the 2001 Inquiry into the M5 East Ventilation Stack. The Parliamentary debate in the Legislative Council on the Roads Amendment (Road Tunnel Pollution Filtration) Bill also demonstrated the quite contradictory positions that are held on the issue of levels of use overseas.¹⁷⁵

¹⁷¹ Scully, *Evidence*, GPSC 4 Budget Estimates Committee 2002-2003, 23 October 2002, p7.

¹⁷² Child N, *Submission No. 86*, p4.

¹⁷³ Curran, *Evidence*, 18 November 2002, p 64.

¹⁷⁴ *ibid*, p 70.

¹⁷⁵ *NSWPD Hansard* 27 June 2002, 26 September 2002 (available through parliament's website at www.parliament.nsw.gov.au).

- 6.11** Rather than debating the prevalence of ESP in tunnels overseas, a perhaps more important argument is the effectiveness of such technology for the purposes which it is installed.

Effectiveness of electrostatic precipitators

Views on effectiveness of the technology

- 6.12** The introduction to the RTA's 2001 Connell Wagner report does contain the basic premise that would be agreed to by all:

The technology for controlling particulate matter is particularly well established using electrostatic precipitators, however the ESPs do not remove gaseous emissions.¹⁷⁶

- 6.13** The value of any survey report is dependent upon the rigour of its investigation and the level of detail it accesses. Conclusions can be falsely drawn from insufficient evidence. There has been some debate about the number of tunnels with ESP filtration that was not operating. The inference often drawn by those opposing ESPs was that the filtration was not effective. Closer review could reveal a different reason:

The Hon. JOHN RYAN: I recognise that there are no other standards than for CO for in-tunnel air quality. However, the famous Drummond tunnel in Burgin, or wherever it is, does not turn on apparently because it does not reach a standard of 300 micrograms per cubic metre, so it has a standard at which it comes on and because that standard has not been achieved within the tunnel it has not switched on.

Ms HOLLIDAY: 300 micrograms of particulate matter?

The Hon. JOHN RYAN: Yes. As I understand it, our tunnel, were it to be measured, could well have levels of up to 1000 micrograms per cubic metre. Is it not reasonable to say that our tunnel seems to be somewhat different from theirs, and perhaps I am simply saying that their not using it in a tunnel where it has been installed overseas, given that our levels appear to be quite significantly over that level, is possibly an ill comparison because in fact, if their equipment were in our tunnel, it would be on almost all the time.

Ms HOLLIDAY: I think we will have to take that comment on board when we are looking at the issue that has been raised by the Chairman.¹⁷⁷

- 6.14** Mr Child described to the Committee the information he had sourced on the use of ESPs in Japan:

CHAIR: In your submission on page 4 you talk about the 60 long tunnels in Japan. Forty-two include EP technology.

Mr CHILD: Yes.

¹⁷⁶ *Detailed Report on International Development in Emission Treatment Systems, Sept 2001, p3.*

¹⁷⁷ *Holliday, Evidence, 15 November 2002, p 55.*

CHAIR: Where did the information come from?

Mr CHILD: That information and I will give you a confirmatory contact, it was provided to me in response to correspondence I put to the roads authority in Japan...

CHAIR: In the Department of Urban Affairs and Planning submission, they said that in the tunnels most of the EPs are switched off. Do you have any evidence that they switch off the EPs in Japan?

Mr CHILD: I do not know. In response to my inquiry, I did not get an answer to that, in fact, I did not put that question to them. I was interested in whether they use it and why. The general view was for visibility, but with a consideration to air quality for health reasons. Obviously the two go together....¹⁷⁸

6.15 The view of the Minister for Roads on the effectiveness of ESPs has been clearly put on the public record, most recently at a 2002-2003 Budget Estimates hearing for GPSC 4:

That is an extraordinary question. We have considered it. In fact there is hardly anything in my portfolio that has been more considered than the practicality of implementing electrostatic precipitators on the M5 East stack. As I have said before—and I will say it again—I am not going to install a high-tech placebo that makes people feel good. As I have said before, in the face of very strong advice of no discernable difference—it deals with a percentage of particulates, as you know—in the pollution levels before and after, even if it extracts a reasonable percentage of particulates, it makes no difference to the quality of the air shed. It does not deal with all the other things that come out of the exhaust of a motor vehicle. It does not deal with oxides and nitrogen, carbon dioxide or carbon monoxide. Even if it did, there is no discernible difference in the quality of the air shed. I have very strong advice, backed up by independent advice outside the RTA, that it would be a waste of public money.¹⁷⁹

6.16 In the current Inquiry the CEO of the RTA, Mr Paul Forward likewise did not indicate support for the effectiveness of ESPs:

Mr FORWARD: These are manufacturer's claims with regard to standards they believe their equipment can meet. We have worked closely with a number of other road authorities on this particular matter, one being the Norwegian Road Authority. To my understanding the company you referred to is a Norwegian company who have installed this equipment in some tunnels in Norway. We have asked the Norwegian Road Authority for evidence that these particular outcomes can be delivered the advice we have from the Norwegian Road Authority is that they are unable to provide us with that documentation. They have no scientifically based evidence that those standards can be met, apart from the manufacturer's claims that are contained in this document.

The Hon. JOHN RYAN: The claim of the manufacturer appears to suggest 90 percent of the particulate matter down to a very small level could be removed. That is a fact is it not?

¹⁷⁸ Child, *Evidence*, 15 November 2002, p 26.

¹⁷⁹ GPSC4 Budget Estimates Committee 2002-2003, 23 October 2002, p7.

Mr FORWARD: That is the claims of the manufacturers. Whether they achieve those standards or not we have been unable to obtain any scientifically backed evidence that that is in fact the case.

The Hon. JOHN RYAN: From one source only, the Norwegian Road Authority?

Mr FORWARD: No we have asked the consultant Connell Wagner to survey the world to try and find evidence that scientifically based studies have been carried out that show that those outcomes have been delivered. To date we have not been able to get access to any scientifically based document. In fact at a conference at an International Road Federation Conference about a year ago, a paper was delivered by an engineer from one of the Norwegian universities, along with a member of the Norwegian Road Authority that actually verified that particular point.¹⁸⁰

6.17 The Residents Against Polluting Stacks are volunteers who are committed to promoting access to information that supports the use of ESPs. As such, they have persevered in undertaking further research where those who have decided that ESPs are not effective have relied extensively upon a single source of information. Mr Mark Curran explained the impetus for their research:

... We are aware that the people depending on us are not faceless but they are our friends and neighbours. They are the people we talk to in the supermarket. We and I have investigated this problem to the best of our ability. We cannot see that the RTA or the other authorities have done so. The only serious investigation, which is now out of date, was carried out by Sam Haddad in 1997...¹⁸¹

The RTA has made a number of claims about electrostatic precipitator equipment and some of it is true and some of it, I believe, is false. They have constantly said that it is used overseas in smoky tunnels. This is true and if there ever was a smoky tunnel it is the M5...¹⁸²

6.18 During the public hearing on 18 November 2002, RAPS tendered a range of documents to the Committee that supported the proposition of ESPs as an effective filtration system. Mr Curran provided evidence of independent assessment undertaken overseas:

The next one... is a set of technical reports. Now there are a series of these. They all come from Norway, but they have nothing to do with CPA, they are all independent reports from the equivalent of a CSIRO testing unit. This one does a series of tests on electrostatic precipitators and shows a particularly high efficiency as claimed using diesel exhaust, which obviously is what you would use if you are going to test the efficiency of something you are going to use in a road tunnel. Then they say that the installations do not always live up to the manufacturer's predictions from the laboratory and those are the laboratory predictions. This may or may not be the case, but it is specifically contradicted by evidence from Norway. This is something from the Norwegian roads authority which says that

¹⁸⁰ Forward, *Evidence*, 18 November 2002, p 19.

¹⁸¹ Curran, *Evidence*, 18 November 2002, p 63.

¹⁸² *ibid*, p 63.

the tunnel is actually working very well and working according to its specifications, what was predicted inside the tunnel.

Let's look at some other tests inside tunnels: The Chimbu tunnel in Korea. The test was carried out by the same testing group. There there was a demonstration of Murphy's law: Everything went wrong with this one. They left a door open between the back and the front of the filter; the fans went off; the power failed; traffic volumes kept on growing. Even so, over three days of testing, they were able to demonstrate that they had the required efficiency of better than 90 percent in that tunnel under real conditions. That is the equipment installed in a real tunnel tested under as realistic conditions as you can.¹⁸³

- 6.19** The argument as to the effectiveness of ESPs generally does not appear to have developed further from the 2001 Inquiry, in that there remain different interpretations being drawn from largely the same information. The most significant change, however, has been in the need to consider solutions to *in tunnel* air quality problems.

In-tunnel filtration

- 6.20** Chapter Five examined the link between visibility and particulate matter concentration. During the context of this on-going debate ESPs have been dismissed as they are primarily used to address in-tunnel visibility.¹⁸⁴ This was because after the decision to construct the single stack at Turrella, the focus was naturally on filtration of the exhaust from the ventilation stack. However it is apparent during this Inquiry that when commenting on ESPs, many opponents of the use of the technology have continued to argue on the basis of it being proposed for external air quality.

- 6.21** It is evident from its submission and evidence given during the Inquiry that PlanningNSW primarily associates the use of filters with external air treatment, and judges it on its (negligible) ability to address carbon monoxide. It appears that PlanningNSW has not given much consideration of the use of ESP filters to address in-tunnel particulate concentrations, and this may be due to its role of regulator for in-tunnel CO levels:

RTA provided an early draft of its 2002 update of international adopted practice with regard to air quality to PlanningNSW in early November 2002. We are still reviewing this document. Whilst it is apparent there have been improvements in efficiency of filtration technology there is still no convincing nor overwhelming evidence it is internationally adopted practice to install treatment systems for external environmental reasons.¹⁸⁵

- 6.22** Later, PlanningNSW were asked whether they had considered in-tunnel filtration:

The Hon MALCOLM JONES: You said in your presentation that there are no international practices for fitting filters for external environmental reasons. Has Planning NSW considered fitting filters for the internal environment of the tunnel

¹⁸³ Curran, *Evidence*, 18 November 2002, p63.

¹⁸⁴ NSWPlanning, *Submission No. 84*, p 15.

¹⁸⁵ Holliday, *Evidence*, 15 November 2002, p 46.

so that, by cleaning the air inside the tunnel, not at the stack, you do not have to blow so much air out?

Mr HATHER: Yes, we have. The main driver, though, in terms of internal air quality in terms of the conditions has been CO. That has been the greatest indicator in terms of compliance, in terms of airflow. If we had a filter in there, yes, it would improve visibility; yes it would reduce particulates, there is no question about that. It would not address the CO problem.

The Hon MALCOM JONES: I did not mention the CO problem. The question was about the overall cleanliness of the air. You spoke about external environmental reasons and I am talking about internal environmental reasons. CO is a component, but it is not the only component.¹⁸⁶

6.23 During questioning, Mr Noel Child agreed with the basic principle that in-tunnel filtration would provide internal and external benefits:

The Hon MALCOLM JONES: Currently there is 900 cubic metres of air per second being processed through the fans and out through the stack. Do you think the idea of having electrostatic precipitators retrofitted inside the main tunnel rather than near the stack to clean the air inside the tunnel, so therefore we can reduce the amount of gas that needs to be pushed through the stack is a practical, worthwhile exercise?

Mr CHILD: If one was going to use technology there is a logical stream to say it is better to use it in the tunnel and therefore derive a benefit on what is discharged and also the internal air than to put it downstream. ... I am not familiar with the design considerations and what facilities are available within the existing tunnel but in principle I agree..¹⁸⁷

6.24 In evidence Mr Child advised that to his knowledge the effectiveness of electrostatic precipitators in removing particulate matter below one micron was yet to be demonstrated. He did concede that technology was under constant evolution.

The Hon JOHN RYAN: If an electrostatic precipitator were operated within the tunnel, would it be fair to say that whilst it would not eliminate particles below one micron, it would remove some of them?

Mr CHILD: Yes

The Hon JOHN RYAN: Because there must be something for the smaller ones to attach to?

Mr CHILD: That is correct, and there would be a view put, if you like, if you have got a problem anything is better than nothing, and if you are able to find the sort of technology that you could retrofit and you could demonstrate, and I have not seen all of the figures, but if it were demonstrated for example that there was an issue with particles within the tunnel, then I think that would tend to drive a particular course of action.¹⁸⁸

¹⁸⁶ Hather, *Evidence*, 15 November 2002, p 49.

¹⁸⁷ Child, *Evidence*, 15 November 2002, p25.

¹⁸⁸ Child, *Evidence*, 15 November 2002, p 26.

6.25 As discussed in Chapter Five, the Committee believes the problems being experienced within the tunnel justify the serious consideration of filtration within the tunnel. This was proposed very clearly in RAPS evidence:

What makes the whole situation so galling is the knowledge that there is a solution, which although it may not be complete, is probably sufficient to enable most to stay, and that is a simple combination of particulate filtration and increased vent speeds, similar to that which was put into position as part of the RAPS agreement.¹⁸⁹

Benefits of in-tunnel filtration

6.26 This report has highlighted:

- the growing scientific concern with the long and short-term effects of exposure to particulate matter, particularly of size PM_{2.5} and less
- the high percentage of particulate matter of size PM_{2.5} and less within diesel emissions
- the large proportion of diesel vehicles among M5 tunnel patrons
- the high concentration of PM_{2.5} and less within the M5 tunnel environment.

6.27 The 2001 Inquiry made the recommendation: “*that filtration equipment be installed in M5 East Ventilation Stack so as to minimise this additional source of air pollution to the Turella region*”. The dissenting statement by Committee members not in favour of the recommendation at the time drew upon comments made by Dr Peter Manins of the CSIRO during his appearance at the public hearing on 1 May 2001.¹⁹⁰

6.28 Despite the fact that it included provisions for the installation of electro-static precipitators within the conditions of approval, PlanningNSW also made reference to the comments of Dr Manins in its submission to this Inquiry:

Dr Manins of the CSIRO stated at the previous Parliamentary Inquiry that he felt “that treatment of the emissions, the particle emissions, is feasible but that it is rather poor value scientifically”. He advised that it would be far more cost effective to reduce the pollutants at the source, using improved fuel standards and engine technology.¹⁹¹

6.29 During this Inquiry and while giving evidence on the concentration of ultra fine particles within the tunnel, Dr Manins was directly asked his view on the benefits of electrostatic precipitator filtration. He saw the benefit as twofold: that it would assist people using the tunnel and those in the surrounding external environment:

¹⁸⁹ Curran, *Evidence*, 18 November 2002, p 64.

¹⁹⁰ General Purpose Standing Committee No 5 *Report on Inquiry into the M5 East Ventilation Stack (2001)* Report 11, July 2001, p94.

¹⁹¹ PlanningNSW, *Submission No. 84*, p 16.

CHAIR: If we were able to do research to show a spike fifteen to twenty minutes per day would lift your average by another eight on an annual or daily basis, it could be substantial. Do you not think it would be worth putting filtration in the tunnel to remove a considerable portion of those particles?

Dr MANINS: I cannot interpret what I understand the epidemiological studies have shown, the relationships which are based on average exposure is over twenty-four hours or over lifetimes; but clearly there are issues that the tunnel air quality is far from acceptable. Removal of particles in the tunnel would have benefit to those people in the tunnel and to those people outside exposed to vent emissions so it would be very positive for both parties.¹⁹²

6.30 Later Dr Manins commented further on the in tunnel issue:

I believe a lot of the argument earlier on was about filtration at the vent, where the flow rates are quite large so the technology was said to be unproven or at the leading edge. We are not talking about that now, I understand we are talking about filtration in the tunnel. If we put filtration on the exhaust perhaps we would still have the problem in the tunnel so the delay has probably been a good thing as far as tackling the real issue which is primarily inside; and by cleaning up inside one would have a consequential benefit outside; where before you would have had to consider putting filtration in the tunnel [already] spent a lot of money putting filtration on the vent itself.¹⁹³

Conclusion

6.31 Given the independent evidence available during this Inquiry that electrostatic precipitators have the potential to address the type of particulate air pollutant problems within the tunnel identified in Chapters Four and Five, it is difficult to understand the NSW Government's continued opposition to installation of ESPs. Two possible explanations are firstly that the opposition is based upon the previous proposals to install filtration within the stack for external air quality; or secondly that of cost, with two other road tunnels proposed by the NSW Government in the near future.

6.32 As this Inquiry has shown, knowledge on particulate matter is changing quickly. Agencies such as the RTA and PlanningNSW risk being locked into entrenched positions based upon past debates, preventing them from modifying their position by applying an open mind to new knowledge as it becomes available. If in the past the Government has not been prepared to meet the cost of filtration for the purposes of improving the external air quality for hundreds of local residents; it faces a problem of a different magnitude now that the tunnel has been in operation. It now needs to consider the potential health risks that a smoky tunnel with a single stack poses to tens of thousands of citizens who use the tunnel daily.

6.33 It is worthwhile to again note that Condition 70 provides that the Proponent must implement any reasonable requirements of the EPA which aim to improve in-tunnel air quality, as requested by the EPA. After almost twelve months of operation and

¹⁹² Manins, *Evidence*, 18 November 2002, p 36.

¹⁹³ Manins, *Evidence*, 18 November 2002, p 37.

consideration of the evidence presented to the Committee it is reasonable to conclude that filtration of the tunnel is a necessity.

- 6.34** The Committee believes the filtration of the tunnel needs to be reconsidered as a matter of the highest priority.

Recommendation 10

The Committee recommends that the NSW Government direct the Roads and Traffic Authority to immediately commence the process for calling for tenders for the installation of electrostatic precipitators within the M5 East tunnel.

Chapter 7 **Other matters: vehicle emissions, wood burners, and the Property Value Guarantee**

The focus of this Inquiry has been the concentrated pollution within the M5E tunnel; the adequacy of the engineering methods used to lessen its effect on in-tunnel and outside air quality; and the harmful health effects that pollution is having on and poses for local residents and tunnel users.

The source of the pollution which is trapped inside and then discharged from the tunnel, is vehicle emissions. This chapter briefly examines some of the initiatives being undertaken to address this problem at its source.

This chapter also examines the success of the wood burner buy back scheme, and the inequity of the current Property Value Guarantee offered to residents within 400 metres of the ventilation stack.

Vehicle Emissions

7.1 A common and undisputed theme throughout the Inquiry was the vital importance of addressing the impact of vehicle emissions at the source. Submissions to the Inquiry from the RTA and the EPA outlined the initiatives being undertaken with respect to vehicle emissions. The Acting Director-General of the EPA, Mr Woodward, reiterated this information during the public hearing:

...The philosophy of the EPA and the Government generally has been to try and get back to the source of the pollution in the first place. In that context it is worth acknowledging the emissions from the M5 East are from actual vehicles, primarily trucks and cars going through the tunnel. Therefore the focus needs to be on reducing emissions from those. In that regard there are new standards coming into place over the next few years that have just started for both cleaner fuels and stricter limits for omissions from diesels and petrol motor vehicles.

In relation to the fuels, petrol for example, the sulphur dioxide level under the national requirements will be limited to 500ppm as of 1 January 2002. Sulphur dioxide contributes to pollution as well as particulates. In 2005 that will drop to 150, a fairly substantial drop. In relation to new diesels in 2003 they will be limited in terms of fuel to 500ppm for sulphur dioxide but by 2006 that will reduce a massive level down to 50ppm. By 2006 for new diesel vehicles that will be an over 90 percent reduction in particulates compared to current emission levels. In practice that means we predict between 2000 and 2020 total hydrocarbons should fall by 26 percent, oxides of nitrogen by 71 percent, carbon monoxide by 75 percent and particles by 35 percent; lead and sulphur emissions should fall dramatically by 93 and 84 percent. In addition emissions of air toxics such as benzene are expected to fall by 50 and 70 percent. That is not to say we should ignore the emissions from the tunnel at the moment...¹⁹⁴

¹⁹⁴ Woodward, *Evidence*, 15 November 2002, p30.

7.2 While endorsing these important measures, the Committee also agrees with the Acting Director-General that the emissions within the tunnel cannot be ignored at this moment. Chapter Five outlined the growing concern over the effects of fine particulate matter. While a 35 percent drop in particles emission by the Year 2020 will be of immense benefit to the entire State community over time, it is understandable that local residents believe that more, or whatever can be done, must be done now.

7.3 Mr Noel Child from RAPS, related the experience in Japan where the magnitude of the vehicle emission problem prompted the authorities to mandate a more immediate change:

... In terms of Japan there is an interesting comment in that have recently suffered seriously in particular in Yokohama and Tokyo from particle pollution. They have taken the view to mandate the introduction of natural gas in their vehicle fleet in those cities — you have to have this many vehicles by such and such a date — boom, boom, boom. They have taken the view, notwithstanding whatever other efforts they make, you have to not only talk around the question it would be nice if we did something at a source but to mandate a change...¹⁹⁵

7.4 During the Inquiry the Committee heard evidence that vehicles with diesel engines are disproportionate contributors of fine particle pollution. The high percentage of diesel vehicle patronage of the M5E serves to exacerbate this problem within the tunnel.

Diesel emissions

7.5 Dr Peter Manins of the CSIRO provided the Committee with information on the contribution made by diesel vehicles to PM_{2.5} concentration in vehicle emissions:

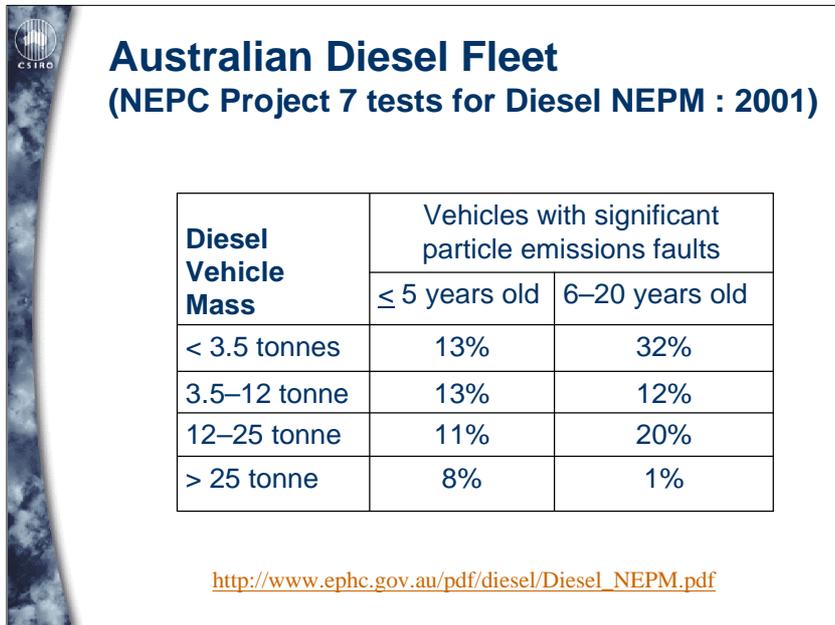
Diesel vehicles contribute between 60 and 80 percent of all particle emissions from the vehicle fleet in general...[and] effectively all diesel emissions of particles are PM_{2.5}...

...diesel vehicles emit very much more mass of fine particles than petrol vehicles, by volume, mass per cubic metre. The next slide shows the Australian diesel fleet...

...all sized diesel vehicles have, I think, a significant failure rate of particle emissions – all sizes and all ages except for the really larger vehicles greater than 25 tonnes that are middle-aged or older and they are generally very well maintained. The failure rate there of particle faults is quite low; but for new vehicles, old vehicles, light vehicles, middleweight vehicles, all have a 10 percent or more failure rate in terms of particle emissions; they emit visible smoke is the general test; this is not good but this is the Australian situation. This is rather different to the European situation because the Europeans are rather more assiduous in checking vehicle emissions and therefore maintaining their vehicle fleet.¹⁹⁶

¹⁹⁵ Child, *Evidence*, 15 November 2002, p25.

¹⁹⁶ Manins, *Evidence*, 18 November 2002, p 32.

Figure 7.1: Australian Diesel Fleet (NEPC Project 7 tests for Diesel NEPM: 2001)

Source: Dr Peter Manins: Presentation, 18 November 2002

7.6 Dr Manins went on to advise the Committee that it is vehicles with faulty emission systems that are the largest contributors to emissions:

CHAIR: Have you any figures as to what proportion of the total particulate matter is from faulty vehicles as opposed to non-faulty vehicles?

Dr MANINS: The Federal Office of Road Safety commissioned a report around 1995 that showed about 80 percent of pollutant emissions were from less than 20 percent of the fleet.

CHAIR: And they were basically faulty?

Dr MANINS: They were basically faulty, yes.

CHAIR: So we could reduce particle emissions by 80 percent if the RTA introduced testing and did not allow these vehicles to pass the test.¹⁹⁷

7.7 The issue of which segments of the diesel fleet were primarily responsible for faulty particle emissions was clarified with Dr Manins:

The Hon. PETER PRIMROSE: Going back to your Australian diesel fleet table, in terms of looking at the mass of vehicles under 3.5 tonnes it seems the table brings out the vehicles with the most significant particle emission faults would be four-wheel drive vehicles between six and twenty years old. What does that actually mean?

Dr MANINS: The table I presented earlier shows that in a survey on diesel vehicles of the older diesel vehicles less than 3.5 tonnes in weight about thirty-two

¹⁹⁷ Manins, *Evidence*, 18 November 2002, p 39.

percent had significant particle emission faults; vehicles less than 3.5 tonnes diesel in the Australian fleet are mostly light delivery vehicles, light commercial vehicles, a lot of them are petrol too but we are talking about diesel vehicles here. They would be light commercial vehicles; they would include four-wheel drives but four-wheel drives have become much more popular only in recent years so they would be in the column for vehicles less than five years old, about thirteen percent of vehicles have faults even though they are quite new. The implication is that an unacceptably high number of diesel vehicles on our roads have faults with particle emissions. I understand EPA in New South Wales has been striving for a little while and is soon to implement – if it has not already - a vehicle inspection program designed to look at pollutant emissions and that would be particularly focused on particle emissions. This is highly desirable.¹⁹⁸

- 7.8** The National Environment Protection Council, at its website, advises that diesel vehicles are increasing as a proportion of the total fleet, and that by 2015 it is expected that diesel vehicle travel in metropolitan areas is expected to increase by 146%.¹⁹⁹

Compliance testing

- 7.9** During evidence, NSW Health provided the Committee with its perspective on the benefits from stronger enforcement of compliance with diesel emission requirements:

Dr SHEPPEARD: Well, we certainly were a participant in the development of the local air quality management plan and one of the key strategies in that was to have a dedicated inspector for smoky vehicles in the region of the M5, so that is one targeted response in that area. Then, of course, there is the national diesel NEPM, the national environment protection measure for diesel vehicles. We have certainly supported the adoption of that in New South Wales.

CHAIR: You do not know if every diesel vehicle is tested annually to see whether it is faulty or not, though?

Dr SHEPPEARD: There is a range of responses that each State can provide to the diesel NEPM and that is one option that the State could implement, but the EPA and the RTA are implementing the diesel NEPM in New South Wales, so they would know the details.

CHAIR: It would appear on the basis of the information that we have received in the last presentation that we could reduce diesel emissions by 80 percent in the city of Sydney merely by ensuring that that these vehicles are off the road until they are fixed. I would think that would be a priority for NSW Health, wouldn't you?

Dr STEWART: That would be a worthy aim, yes.²⁰⁰

¹⁹⁸ *Evidence*, 18 November 2002, p37.

¹⁹⁹ NEPC website at: www.ephc.gov.au/nepms/diesel_intro.html, accessed 27/11/02.

²⁰⁰ *Evidence*, 18 November 2002, pp 46-47.

Diesel NEPM

- 7.10** On 29 June 2001, the National Environment Protection Council (NEPC) made the National Environment Protection (Diesel Vehicle Emissions) Measure (NEPM).
- 7.11** The purpose of the Measure is to provide a framework for the management of emissions from the in-service diesel fleet. It is designed to facilitate compliance with in-service emissions standards developed in conjunction with the National Road Transport Commission.
- 7.12** The Measure includes strategies for use by jurisdictions to ensure that in-service diesel vehicles are adequately maintained. The Measure provides guidance for developing:
- Inspection and maintenance programs
 - Fleet maintenance programs
 - Smoky vehicle programs
 - Retrofit programs (eg fitting catalyst to diesel vehicles)
 - Engine re-build programs.
- 7.13** The Committee understands the Roads and Traffic Authority has developed a trial short diesel emissions test. It is in the process of testing some government fleet vehicles, primarily from the State Transit Authority (STA), it is also testing some private fleets on a voluntary basis.
- 7.14** The Environment Protection Authority website provides the following information on action that has and is being taken to make cars, trucks and buses cleaner:

The inspection and maintenance program for in-service passenger and light commercial petrol-fuelled vehicles aims to improve air quality by identifying vehicles with poor emission performance and ensuring that appropriate repairs are made. Roads and Traffic Authority facilities provide for the mandatory testing of smoky vehicles identified through the smoky vehicle enforcement program and voluntary testing for the general public. Stage 1 of the inspection and maintenance program is currently operating. This involves free voluntary testing for all car owners until the end of 2000. Stage 2 of the program will involve compulsory regular testing, before registration, of all Sydney-based passenger and light commercial vehicles over a certain age. The full testing program will be extended to the Illawarra and Hunter under stage 3.

Emissions of volatile organic compounds, carbon monoxide and oxides of nitrogen by the vehicles targeted in the inspection and maintenance program are expected to be reduced by 15%, 25% and 9% respectively. The EPA is involved in research to establish an appropriate test for emissions from diesel vehicles. Once

this test is developed, the government will be able to consider extending the inspection and maintenance program to diesel vehicles.²⁰¹

- 7.15** Recommendation 11 of the 2001 Inquiry into the M5 East Ventilation Stack included 'the introduction of emission testing for all vehicles in conjunction with registration checks'. The Roads and Traffic Authority advised that this recommendation was addressed to the NSW Government generally and as such it is not a matter which the RTA is in a position to address. The RTA would nevertheless co-operate in relation to the development and implementation of any such measures.²⁰²
- 7.16** The Committee has heard evidence that identifies diesel engine vehicles as the primary contributors to dangerous particle emissions, particularly in metropolitan areas. The Committee directs its recommendation for urgent and required action to the NSW Government.
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Recommendation 11

The Committee recommends that the NSW Government, as a high priority, enforce compulsory emission testing as a condition of registration for Sydney-based diesel-engine vehicles.

Wood fire burners buy-back

- 7.17** Chapter Three noted the RTA response to the Committee's 2001 recommendation regarding a regional air quality improvement program. One of the important initiatives in this was said to be the wood fire burner buy-back scheme, aimed at reducing air pollution in the region caused by wood smoke.
- 7.18** The issue of the level of success of the solid fuel heater buy back scheme is an example of what residents claim to be perhaps illustrative of the decision by agencies involved to emphasise the positive aspect of M5E-related initiatives without necessarily providing all the information available to them.
- 7.19** The RTA advise that over 260 applications have been received for the buy-back scheme. In giving evidence to the Committee, the Acting Director General of the EPA stated that he understood "about 200 people have taken advantage of that of the moment to move towards cleaner fuel for home heating such as natural gas".²⁰³ Similarly in its submission PlanningNSW notes that it "has been advised that there has been around 260 buy-back applications".²⁰⁴

²⁰¹ EPA, *SoE 2000*, http://www.epa.nsw.gov.au/soe/soe2000/ca/ca_3.4.htm, accessed on 27/11/2002.

²⁰² Roads and Traffic Authority, *Submission No.85*, p7.

²⁰³ Woodward, *Evidence*, 15 November 2002, p31.

²⁰⁴ PlanningNSW, *Submission No. 84*, p21.

7.20 The submissions provided no advice as to how many applications had progressed through to replacement since the scheme began on 1 July 2002. At the Budget Estimates hearing of 23 October for GPSC 4 the question of the success of the scheme, which has an allocation of \$200,000 per annum and \$500 to \$700 (for pensioners) per individual proposition, was raised with the Minister for Transport:

The Hon DAVID OLDFIELD: At our last opportunity to talk to you regarding the M5 East I asked about the impact of the buyback of wood and coal-burning heaters. Is it correct that as at 7 October only three people had taken up the proposition of buyback?

Mr SCULLY: I would have to take on notice the exact number, but it would not surprise me if not many did. I think a lot of folks like their wood burners but they do impact on the environment, as you probably know.²⁰⁵

7.21 RAPS in its submission to the Inquiry indicated that it had been advised that only three²⁰⁶ people had actually followed through on their application. If so the continued failure of the agencies to report the actual reduction in wood fire burners is of great concern. If only three wood fire burners have been bought by the RTA the contribution of this initiative to improving regional air quality is negligible, and the authority needs to reconsider a more effective approach. Similarly RAPS suggest the quoting of figures on smoky vehicles by the RTA is likewise evidence of a regional air program that is not working:

The EPA stated 200 people have taken up the woodheater buy back, when in fact only 3 have. Likewise, PlanningNSW stated that 280 smoky vehicles have been fined by EPA, when in fact they have only been reported to the EPA. Given the 25 million vehicles that have passed through the tunnel, this hardly constitutes net improvements to local or regional air quality.²⁰⁷

Property buy back guarantee

7.22 Chapter Three outlined the RTA's response to the Committee's recommendations in its 2001 report regarding the property buy back scheme. Essentially the RTA response was that this was a political decision.

7.23 In a Budget Estimates hearing held by General Purpose Standing Committee No 4 the Minister for Transport the Hon Carl Scully MP said:

Mr SCULLY: If they are within the zone of the property guarantee they are entitled to have their home bought. If any of those people are within that, they should proceed to follow the protocols to have their home bought by the RTA.

The Hon. IAN COHEN: Given the adverse visual and pollution impacts from the stack what would you estimate the percentage loss on homes near the stack to be?

²⁰⁵ Scully, *Evidence*, GPSC4 Budget Estimates Committee 2002-2003, 23 October 2002, p10.

²⁰⁶ In answers to questions taken on notice during the public hearing, received on 3 December 2002, the RTA advised that as of 28 November 2002 seven applicants had received a rebate cheque.

²⁰⁷ RAPS, *Supplementary Submission No. 88*, p3.

Mr SCULLY: The opening of the M5 East has resulted in a noticeable increase in property value in that surrounding area. Talk to any real estate agent, property values in fact have gone up more than the surrounding Sydney property market.²⁰⁸

7.24 The terms of the Property Value Guarantee (PVG) offered to compensate residents affected by the M5 East Ventilation Stack has been cause for severe dissatisfaction among local residents. The two primary causes for this dissatisfaction are the arbitrary 400 metre eligibility zone and the less generous terms when compared to the 1997 PVG that was offered to residents affected by the construction of the roadway tunnel.

7.25 RAPS engaged Mr Alan Hyam OAM, Barrister-at-Law, Life Fellow of the Australian Property Institute, and Registered Valuer to prepare a report and comparative review of the PVG. This document was tabled at the Committee's public hearing of 18 November 2002. Pertinent comments from that document include:

4.1 It seems to me incongruous that the 2001 Procedure is less generous than the 1997 Procedure, and that the provisions of the *Just Terms Act* are excluded.

4.4 It is apparent that the RTA has blighted the properties within the area in which the 2001 Procedure applies...Because of the blight factor those owners would be unlikely to be able to sell their properties at unaffected prices.

4.7 It appears to me that the procedure is not logical. What the RTA is saying is to try to sell your property on the open market for a lengthy period of time, and if you are unsuccessful we might buy it an unaffected value, but we won't pay you until we have sold the property. We will not pay you any of the items of compensation to which an owner would be entitled if the property was acquired pursuant to the terms of the *Just Terms Act*. This certainly is not in accord with the notion of just terms which is enshrined in the *Just Terms Act*.

6.6 I consider that it is not fair that the affected owners should be asked to suffer from offering their properties for sale on the open market for an inordinate period of time [six months], the deferral of the purchase of replacement properties until the RTA has sold the properties, the payment of an increased price for replacement properties because of the delay, and to receive payment on less generous terms than those paid to owners under the 1997 Procedure or the provisions of the *Just Terms Act*.²⁰⁹

7.26 The Committee sought clarification from local residents on the reasons for their dissatisfaction:

The Hon MALCOLM JONES: Can you just expand, briefly please, on your disappointment with the property guarantee from what was originally promised to what the reality is?

Ms MAWER: We were seeking something similarly [to the 1997 offer]. It is page 42 of our submission. When we were still pursuing either a radical redesign of the ventilation system or filtration of the stack, depending at which point of the continuum we were at the time, we contacted the CFMEU who were building the

²⁰⁸ Scully, *Evidence*, GPSC No 4 Budget Estimates Committee 2002-2003, 23 October 2002, p5.

²⁰⁹ Document tabled by Giselle Mawer, 18 November 2002.

tunnel and they were very sympathetic to our cause. We went to see John Sutton to see if we could get filtration and actually put a green ban on the project. In February 2001 the minister announced the offer which was the result of negotiations between the CFMEU and the RTA where they lifted the ban. I know from speaking to the national secretary, John Sutton, at the CFMEU, that he was under the impression at the time of the negotiations that we got the same the procedure and in fact the media release that came out from the minister said that we got an extension. An extension usually means the same as. However, when we got the fine detail after it had been approved it was very, very different, a much more punitive, much more restrictive offer. None of us really want to move, we love where we are, we love our community.

The Hon JOHN RYAN: I think one of the significant differences is the treatment of stamp duty on your new property.

Ms MAWER: It is stamp duty, legal fees, removal allowance, survey fees, building/pest report, disbursements, plus you have to pay for your own advertising campaign and your own independent valuation if you do not agree with the one of the RTA, plus it is limited to 270 properties within a 400 metre circle that does not accord with either the visual impacts or the worst air quality impacts, so there are quite a few people and those two people who are detailed in that bundle of documents we gave you were just outside the 400 metres.²¹⁰

7.27 The Committee heard that while seeking a PVG with just terms, any offer can not fully compensate for the upheaval of having to uproot oneself from a sense of community:

... It does not pay for the intangible things of having to find new friends and new doctors and family. My neighbours, for example, have their parents next to them. Another neighbour has three generations of people there. It is not so easy to relocate.²¹¹

7.28 A both hearings held during this 2002 inquiry the Committee heard residents raise the ethical dilemma of selling to buyers when the seller believes the stack has negative health impacts:

...people with consciences, if you see a buyer coming up who have two young kids with them, what do you actually tell them? Do you say nothing about the stack? It is a disgraceful situation that this Government has put this community in.²¹²

...That is what I have found in the area. People do not understand a lot of the stuff when you have community meetings and everything when you explain what is happening, because there is nothing in the media, they are shocked. If I sell my house, that is fine, I get out, but some poor sucker is stuck there too, and if they have got kids, it is a major, major problem...²¹³

²¹⁰ Mawer, *Evidence*, 18 November 2002, pp 70-71.

²¹¹ Mawer, *Evidence*, 28 November 2002, pp71-72.

²¹² Briers, *Evidence*, 18 November 2002, p 72.

²¹³ Snepvangers, *Evidence*, 15 November 2002, p 5.

- 7.29** In submission to the Inquiry the Residents Against Polluting Stacks proposed the inequity of the current PVG be addressed by:
- Any residential or commercial property affected be offered a property value guarantee equivalent to that offered in December 1997.
 - The decision as to which properties are affected be made following a rigorous assessment of the air quality and visual impacts of the exhaust stack.
 - 'Hardship' be clearly defined and the PVG be extended indefinitely so that people who can show they or their families have been detrimentally affected are not disadvantaged in the sale of their properties.
- 7.30** As noted in Chapter Five, NSW Health is commencing a study to determine the existence of adverse health impacts on local residents attributable to the ventilation stack. The minimum timeframe for this study is six months. It would seem inappropriate to terminate the PVG until at least the results of this study are available.
- 7.31** The Committee believes that recommendations 4 and 5 of its 2001 report are still pertinent. The RTA in its response denies responsibility for the PVG, in effect stating that its terms are a political decision by the NSW Government. On this basis the Committee directs its current recommendation to the NSW Government to make a decision to redress the current causes of concern for local residents as to the inequities in the Property Value Guarantee.

Recommendation 12

The Committee recommends that the NSW Government immediately implement recommendations 4 and 5 of the Committee's 2001 Report regarding the Property Value Guarantee.

Conclusion

- 7.32** One of the ways of identifying an unpopular decision by governments is the way ordinary citizens are turned into activists by an issue that affects their lives and that of their families. Other decisions of this nature, such as closures of inner city schools, have resulted in ultimate acknowledgement by the current government that previous decisions need reconsideration. It is clear from this Inquiry and the level of interest in the very brief time frame in which this Inquiry was conducted that unless genuine action is taken to address the concerns of local residents, and increasingly, users of the tunnel, the M5 will continue to be a source of conflict and resentment in the communities affected.
- 7.33** The Committee therefore concludes with words of local residents on their experience, reflected in the three Inquiries to date:

With regard to the tenor of the question and the range of those issues in there, none of us here would like to have taken part in three parliamentary inquiries. None of us here would like to have had to worry about our children and ourselves being sick. None of us here would have to worry about what is happening if there was due process. One of the issues that is highlighted, we are not ratbags, whingers, blatantly ignoring scientific evidence. If you hear people like Mark Curran, we are actually on the cusp of probably more scientific breakthrough evidence with regard to air quality issues than anyone else in Australia right now.

We have actually funded studies ourselves. We get people who cannot speak English. We take the time in the local area to look at those areas and look at the science, stick our own hands in our own pockets to do whatever we need to do. We are not blatant whingers, but you can see from the evidence before you, as Charles Briers has said, you are currently looking at a tunnel which has got traffic volumes that will be 2010 traffic volumes. You are looking at a political decision to stick a stick in the bottom of a valley. You are looking at the fact that the tunnel cannot operate efficiently. You are looking at a tunnel that is jam-packed. You are looking at people who will get all the traffic back on the streets as they had before. You are looking at people here who do not get the same fair go as everybody else with regard to property value guarantees. You are looking at people here who are being criticised outside parliamentary inquiries through personal attacks and everything else.²¹⁴

In this meeting and every other meeting that we have been to, with either the RTA or the Minister or whatever, we are the only people who go there who are not paid. We are sick of it in more ways than one. We are sick from the tunnel, we are sickened by the process, we are sickened by the outcome and the impact, and so are a lot of other people.²¹⁵

²¹⁴ Sapios, *Evidence*, 18 November 2002, p 73.

²¹⁵ Mawer, *Evidence*, 18 November 2002, p 74.

Appendix 1

Submissions

Submissions

No	Author
1	SOLE Mr Keith
2	LIMBURY Mr Alan (<i>Strategic Resolution</i>)
3	STEINBERG Mr Karl
4	GEORGE Ms Elizabeth
5	KINSCHER Mr T D
6	STANISLAV Mr Kos
7	RIDSDALE Mr/Ms B
8	ARNOLD Ms Lucie
9	TUCHA Mr Dietmar
10	FITZSIMMONS Mr Dominic
11	RIDSDALE Mr Mark (<i>Vision Med Pty Ltd</i>)
12	SCHIAVELLO Mr Joe (<i>Partially confidential</i>)
13	KAMATH MD, FRACP Assoc Prof Dr Ramanand
14	LAVELLE Ms Keren
15	MALTBY Mr Chris
16	RAMSAY Mr Ross (<i>M5 East AQ&CLG</i>) (<i>Partially confidential</i>)
17	RIDSDALE Mr Tony
18	DAY Ms Marie
19	MATHESON Mr Frank (<i>FBM Project Management & Engineering Services P/L</i>)
20	BRIEN Mr Dale
21	BROOKE Mr Roger
22	ALEXANDER Mr Warren
23	ALEXANDER Ms Mercia
24	HERBERT Mr Brian
25	MAWER Ms Danielle
26	BRIERS Mr Paul
27	PLATER Mr Merrick
28	TIZZONE Mrs Nada
29	BURKE Ms Adele
30	GULSON Mr Gus
31	SNEPVANGERS Mr Peter
32	BRIERS Mr David
33	LAKSHMI Ms Lalita (<i>Uniting Care Harris Community Centre</i>)

34	BEST Dr Peter (<i>Katestone Environmental</i>)
35	COLUBRIALE Mr & Mrs
36	HIGGINS Dr Les
37	DE LEAU Ms Lesa
38	LANGLEY Mr Flash
39	MAWER Mr Simon
40	BRIERS Ms Georgina
41	BOUTROS Mr Yafa
42	ROBERTS Mr Colin (<i>M5 East AQ & CLG Committee</i>)
43	TJIONG Mr Richard
44	ROSSI Ms Angela
45	GIZAS Ms Patricia
46	ROSSI Mr Riccardo (<i>Residents Against Polluting Stacks</i>)
47	FORRESTER Mr
48	DANCZ Mr & Mrs
49	GIBBS Mr & Mrs
50	MOORE Prof. Michael (<i>National Research Centre for Environmental Toxicology</i>)
51	CONFIDENTIAL
52	BRIERS Mr Charles (<i>RAPS (Residents Against Polluting Stacks) Inc</i>)
53	BARTLETT Mr Christopher
54	CONFIDENTIAL
55	TOUMA Ms Natalie
56	TOUMA Mr David
57	TOUMA Mr Morris
58	TOUMA Ms Gihan
59	TOUMA Mr Simon
60	TOUMA Mr Amal
61	NAGLE Ms Emily
62	ELLISTON Ms Danielle
63	ELLISTON Ms Toni
64	ELLISTON Mr Richard
65	ELLISTON Ms Katrina
66	STARK Ms Cathy
67	TOUMA Mr Paul
68	TOUMA Ms Anna
69	STARK Mr Peter

70	STARK Mrs Betty
71	STARK Mr David
72	KEARNEY Dr Ray (<i>Lane Cove Tunnel Action Group</i>)
73	GREINER Mr Nick (<i>Baulderstone - Hornibrook</i>)
74	JONES Ms Joanne (<i>Rockdale City Ratepayer's Action Group</i>)
75	HOLMES Dr Kerry (<i>Holmes Air Sciences</i>)
76	POLLEY Mr Keith
77	ZARIFFA Ms Mona
78	PHILIPS Mr & Mrs Paul & Yolande
79	SCOTT Ms Ruth
80	TIPPETT Mr John
81	CADSKY Ms Isabelle
82	HEFFERAN Ms June (<i>Groups Against Polluting Stacks</i>)
83	DUDLEY Ms Berice (<i>Sydneysiders Against Polluting Stacks</i>)
84	HADDAD Mr Sam (<i>PlanningNSW</i>)
85	NAJEM Mr M (<i>Roads and Traffic Authority</i>)
86	CHILD Mr Noel (<i>Child & Associates</i>)
87	WOODWARD Mr Colin (<i>Environment Protection Authority</i>)
88	RAPS (<i>Residents Against Polluting Stacks Inc</i>)
89	ERCAN Mr/Ms Muharrem
90	ERCAN Mr/Ms Seher
91	ERCAN Mr/Ms Samil
92	ERCAN Mr/Ms Nuran
93	ERCAN Mr/Ms Cevat
94	NAVARRO MAROTE Ms Isabel
95	MORAWSKA PHD Assoc. Prof Lidia (<i>Queensland University of Technology</i>)
96	CASEY Mr Kevin (<i>Rockdale City Council</i>)
97	HENSLER Mr David
98	WINDER Assoc. Prof Chris (<i>The University of New South Wales</i>)

Appendix 2

Witnesses / Site Visit

Witnesses

Friday, 15 November 2002	<i>(Parliament House, Sydney)</i>
Ms Anne Gotsis	Local resident
Ms Magda Danz	Local resident
Mr Peter Snepvangers	Local resident
Mr Walter Forrester	Local resident
Dr Peter Best	Air Quality Scientist <i>Katestone Environmental</i>
Mr Noel Child	Consulting Engineer <i>Child & Associates</i>
Mr Joe Woodward	Acting Director General <i>NSW Environment Protection Agency</i>
Mr Michael Crowley	Manager, Sydney Planning <i>NSW Environment Protection Agency</i>
Ms Penny Finlay	Principal Officer, Sydney Planning <i>NSW Environment Protection Agency</i>
Mr Chris Eiser	Director, Atmospheric Science <i>NSW Environment Protection Agency</i>
Ms Susan Holliday	Director General <i>PlanningNSW</i>
Mr Sam Haddad	Executive Director, Sustainable Development <i>PlanningNSW</i>
Mr Mark Hather	Director, Major Infrastructure Assessment <i>PlanningNSW</i>

Monday, 18 November 2002	<i>(Parliament House, Sydney)</i>
The Hon Nick Greiner	Chairman of the Board <i>Baulderstone - Hornibrook</i>
Mr David Tucker	Operations & Maintenance Manager <i>Baulderstone - Hornibrook Billfinger Berger</i>
Mr Craig Burrell	Associate <i>Hyder Consulting</i>
Mr Paul Forward	Chief Executive <i>NSW Roads and Traffic Authority</i>
Mr Gerry Humphrey	General Manager, Motorway Services <i>NSW Roads and Traffic Authority</i>
Mr Phil Gallagher	Motorway & Tollway Operations Manager <i>NSW Roads and Traffic Authority</i>
Ms Jay Stricker	General Manager, Environment and Community Policy <i>NSW Roads and Traffic Authority</i>
Dr Peter Manins	Chief Research Scientist, Leader, Atmospheric Pollution Program <i>CSIRO</i>
Dr Greg Stewart	Deputy Director General, Public Health & Chief Health Officer <i>NSW Health</i>
Dr Stephen Corbett	Acting Director, Health Protection <i>NSW Health</i>
Dr Vicky Sheppard	Acting Associate Director, Environmental Health <i>NSW Health</i>
Dr Kerry Holmes	Air Quality Scientist <i>Holmes Air Sciences</i>
Mr Charles Briers	President <i>RAPS (Residents Against Polluting Stacks) Inc</i>

Mr Mark Curran	<i>RAPS (Residents Against Polluting Stacks) Inc</i>
Ms Giselle Mawer	<i>RAPS (Residents Against Polluting Stacks) Inc</i>
Mrs Judith Rossi	<i>RAPS (Residents Against Polluting Stacks) Inc</i>
Mr Peter Siapos	<i>RAPS (Residents Against Polluting Stacks) Inc</i>

Site visit

Monday, 11 November 2002

M5 East Motorway Control Centre:

- Mr John Battalgia, Acting General Manager, BHBEgis
- Mr David Stuart-Watt, Manager Client Services, NSW Roads and Traffic Authority

M5 East Ventilation Stack, Turella

- Mr John Battalgia, Acting General Manager, BHBEgis
- Mr Peter Hejtmanek, BHBEgis
- Mr David Stuart-Watt, Manager Client Services, NSW Roads and Traffic Authority

Mr Mark Curran and Ms Giselle Mawer from Residents Against Polluting Stacks, took the committee to view the following areas:

- Ventilation stack
 - surrounding areas from the Duff Street vintage point
 - tunnel portal
 - surrounding areas at the Kingsgrove Avenue end of the M5 East Tunnel
 - Wavell Parade monitoring station, and the
 - home of a local resident
-

Appendix 3

Planning NSW, Conditions of Approval for M5 East Tunnel

Conditions of approval for the M5 East Tunnel

SCHEDULE 1

PROPOSED M5 EAST MOTORWAY (FAIRFORD ROAD, PADSTOW TO GENERAL HOLMES DRIVE , KYEEMAGH)

CONDITIONS OF APPROVAL

The following acronyms and abbreviations are used in this document:

Department, The	Department of Urban Affairs and Planning
Director-General, The	Director-General of the Department of Urban Affairs and Planning (or nominee)
DLWC	Department of Land and Water Conservation
DoT	Department of Transport
DPWS	Department of Public Works and Services
EIS	Environmental Impact Statement and Supplement
EMP	Environmental Management Plan
EMR	Environmental Management Representative
ENCM	EPA's Environmental Noise Control Manual
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	NSW Environment Protection Authority
FAC	Federal Airports Corporation (Sydney Airport)
LAIP	Local Area Improvement Programme
Minister, The	Minister for Urban Affairs and Planning
NGR	Northern Georges River submain sewer
NO ₂	Nitrogen Dioxide
NPWS	National Parks and Wildlife Service
PM ₁₀	Particulate Matter Smaller Than 10 µm (micrograms)
ppm	Parts per Million
Relevant Councils	Any one or more of the following Councils as applicable: Bankstown, Canterbury, Hurstville, Rockdale
RTA	Roads and Traffic Authority
SWC	Sydney Water Corporation
SWSOOS	South Western and Southern Ocean Outfall Sewer
The Proponent	The Roads and Traffic Authority
µm	Micrograms
VEPA	Victoria Environment Protection Authority

The specific reasons for these conditions are set out in *Proposed M5 East Motorway - Fairford Road, Padstow to General Holmes Drive, Kyeemagh: Director-General's Report* dated November 1997.

Except where the context indicates otherwise, any reference in this schedule to construction includes any clearing, earthworks or demolition works at the specific location(s) and/or section(s) of road where the identified impacts relate, unless otherwise specified by the Director-General.

65. Fixed plant associated with the proposal including ventilation stacks, equipment, fans etc, must be designed to comply with EPA criteria for stationary sources as outlined in Chapters 19-21 of the ENCM.

Air Quality

Construction Stage

66. As part of the EMP referred to in condition 10, a specific Construction Stage Air Quality Procedure must be prepared to the satisfaction of the EPA. The Procedure shall provide details of all dust control measures to be implemented during the construction stage sufficient to address the technical requirements for any EPA approvals/licences. The Procedure must include measures to reduce dust from stockpiles and cleared areas or other exposed surfaces. Measures such as temporary planting of stockpiles and progressive rehabilitation of any exposed areas should be designed to achieve EPA local air quality protection goals. The Procedure must also identify the potential for odours and incorporate strategies for dealing with this issue.
67. All construction vehicles shall be maintained and covered to prevent any loss of load whether in the form of dust, liquid, solids or otherwise and shall be maintained in such a manner that they will not track mud, dirt or other material onto any street which is opened and accessible to the public. Without limiting the generality of this requirement, the Proponent shall install and maintain a wheel wash facility for effective wheel cleaning of construction equipment prior to it leaving construction areas and/or other such devices to ensure that material from construction vehicle tyres is not deposited on nearby streets.
68. Equipment and facilities necessary for the control of the potential odour problems from activities in the Cooks River must be approved by the EPA, and must be ready on site before the activities can be carried out.
69. No open burning or incineration shall be permitted on site.

Operation Stage

70. The tunnel ventilation system(s) must be designed and operated so that the World Health Organisation (WHO) 15-minute carbon monoxide (CO) goal of 87 ppm is not exceeded under any conditions. The design must be independently verified to the satisfaction of the Director-General, prior to the commencement of operation, by an independent person(s) or organisation(s) to be approved by the Director-General. The Proponent must develop and implement a tunnel air quality monitoring and reporting system to the satisfaction of the EPA. The system must be installed and fully operational prior to the commencement of tunnel operations. The Proponent must implement any reasonable requirements of the EPA which aim to improve in-tunnel air quality, as requested by the EPA.
71. Tunnel portals must be designed to avoid air being recirculated between tunnel portals. The ventilation system for the main tunnel (Bexley Road to Marsh Street) must be designed to avoid air emissions, through the portals, as far as is practical. In any event,

the air emissions must not result in the following ambient air quality emerging goals being exceeded at ground level:

NO₂ - One hour average of 256 µg/m³ (0.125 ppm)
 PM₁₀ - 24 hour average of 50 µg/m³

The design must have regard for the current short term Victoria EPA 3 minute design ground level concentration criteria of:

Toxic Organic Compounds

Benzene - 3 minute average of 0.10 mg/m³ (0.033 ppm) (VEPA); and
 1-3 Butadiene - 3 minute average of 1.0 mg/m³ (0.45 ppm) (VEPA)

Odorous Compounds

Acetaldehyde - 3 minute average of 0.076 mg/m³ (0.042 ppm) (VEPA); and
 Formaldehyde - 3 minute average of 0.10 mg/m³ (0.033 ppm) (VEPA)

The portal design must be independently verified to the satisfaction of the Director-General, prior to the commencement of operation, by an independent person(s) or organisation(s) to be approved by the Director-General.

Modelling of emissions from the Cooks River tunnel must be undertaken, to the satisfaction of the EPA, prior to the commencement of operation. The portals must be designed to minimise emissions and aim to achieve the emerging goals and criteria referred to above, as far as is practical, and to the satisfaction of the EPA.

72. The tunnel exhaust stack must be designed so that emissions do not result in ambient air quality at ground level exceeding the following emerging goals:

NO₂ - One hour average of 256 µg/m³ (0.125 ppm)
 PM₁₀ - 24 hour average of 50 µg/m³

The design must have regard for the current short term Victoria EPA 3 minute design ground level concentration criteria of:

Toxic Organic Compounds

Benzene - 3 minute average of 0.10 mg/m³ (0.033 ppm) (VEPA); and
 1-3 Butadiene - 3 minute average of 1.0 mg/m³ (0.45 ppm) (VEPA)

Odorous Compounds

Acetaldehyde - 3 minute average of 0.076 mg/m³ (0.042 ppm) (VEPA); and
 Formaldehyde - 3 minute average of 0.10 mg/m³ (0.033 ppm) (VEPA)

73. The height of the tunnel exhaust stack must be higher than 25m high unless otherwise approved by the Director-General, upon advice from the EPA. Wind tunnel testing must be undertaken of the stack, by an independent organisation to be approved by the Director-General, prior to detailed design, in a manner approved by the EPA.

The Director-General in consultation with the EPA shall approve the height of the stack above 25m as deemed necessary to improve dispersion of emissions and/or to reduce the

potential impact of emissions on the local population, after considering the results of the wind tunnel testing and any advice from the EPA. The Proponent must comply with any reasonable request of the Director-General to raise the stack.

74. The tunnel ventilation system must make provision, to the satisfaction of the Director-General, for the installation of treatment systems, including electrostatic precipitators and gas treatment systems. The Director-General may require the installation of a treatment system by the Proponent, after considering the results of independent monitoring (as per condition 75), whether emissions comply with the goals specified in condition 72, input from the Community Consultative Committee specified in condition 78 and the views of the EPA, and the outcome of investigations from condition 80. In any case, any treatment system can only be required if there is an exceedance of the goals specified in condition 72.
75. The Proponent must install a comprehensive monitoring network, including dedicated stations in the Turrella and Undercliffe areas, for ambient air quality measurements. The location of the network and pollutants to be monitored must be developed in consultation with the EPA and the Committee referred to in condition 78, and be approved by the Director-General. The network must provide for extensive monitoring of stack emissions. The monitoring station(s) and network must be installed and operational, as applicable, at least 6 months prior to commencement of tunnel operations. Monitoring must be carried out by an independent organisation, to be approved by the Director-General, and reports must be made available at 6 monthly intervals from the date the Motorway commences operation. The reports must be made available to the Director-General, the EPA, relevant Council(s) and the Committee referred to in condition 78, and must be made publicly available. The total duration of the monitoring shall be as requested by the Director-General.
76. The exhaust stack and air intakes must be designed in consultation with relevant Councils and must be architecturally sympathetic with other development in the vicinity. They must be consistent with the urban design principles referred to in conditions 42 to 45.
77. Prior to the commencement of construction of the tunnel exhaust stack, the Proponent must comply with the reasonable requirements of the FAC for the stack.
78. A Community Consultative Committee must be established by the Proponent. This Committee must include representatives from the Turrella and Undercliffe areas and relevant Council(s), and must be established prior to the commencement of construction. The Committee's role includes: input into defining/formulating air quality monitoring requirements; accessing and disseminating monitoring results and other information on air quality issues; and associated potential impacts.
79. The Proponent must examine international developments in tunnel emission treatment systems, in consultation with the EPA and the Director-General. The Proponent must report on the outcome of these examinations (including the cost effectiveness of systems) for five years on an annual basis from the date of approval and thereafter as required by the Director-General. The results must be made available to the Director-General, the

EPA, relevant Council(s) and the Committee referred to in condition 78, and must be made publicly available, upon request.

80. The Proponent must continue to participate with the Department of Urban Affairs and Planning, the Department of Health, the Department of Transport and the EPA, at its own expense, in investigations into subregional air quality and participate in identifying strategies for improving air quality. The aim of the investigation is to identify key contributors to air pollution in the sub region and formulate cost effective measures to control/manage such contributors. The Proponent must contribute to the implementation of any control measures within its areas of responsibilities.
81. The Proponent must set aside a sum of \$0.5 million per year over a period of 5 years, commencing from the start of the proposal's operation. This allocation is to be used, as necessary and as applicable, towards funding air quality improvement measures arising out of the studies in condition 80 above.

Flora and Fauna

82. All practical preventative measures must be taken in order to minimise any potential disturbance of habitats surrounding work sites.
83. No spoil material shall be dumped in a manner so that it is likely to have a significant effect on threatened species, populations, ecological communities or their habitats. As far as possible, spoil shall not be dumped in areas containing native vegetation. Any dumping of spoil must be consistent with the management plan referred to in condition 93.

Green and Golden Bell Frog

84. The Proponent must comply with the conditions of concurrence as determined by NPWS.

Salt Pan Creek Wetland

85. The Proponent must prepare a plan of management for that part of the Salt Pan Creek wetlands affected by the proposal. The plan of management must address measures for the protection and revegetation of these wetlands both during and after construction of the Motorway. The plan of management must be prepared 1 month prior to construction, or as otherwise agreed by the Director-General, to the satisfaction of the Director-General.

Cooks River Clay Plain Scrub Forest

86. The proposed Motorway route shall not pass through any areas of Cooks River Clay Plain Scrub Forest, at the site located adjacent to Rosebank Avenue between Beverly Grove Park and Canterbury Golf Course, without the approval of the Director-General. Prior to seeking approval, the Proponent must prepare an assessment of the ecological values of the community and identify proposed mitigation measures. Consideration must also be given to other impacts in this area, including impacts on open space and nearby dwellings. The assessment must be prepared in consultation with NPWS.

DEPARTMENT OF URBAN AFFAIRS AND PLANNING

SCHEDULE 1

This schedule addresses outstanding operation stage air quality issues. These conditions need to read in conjunction with the Minister for Urban Affairs and Planning's Conditions of Approval issued on 9 December 1997.

Condition 73.

1. The stack shall be constructed to a minimum height of 35 metres.
2. The final materials and finish of the stack shall be approved by the Director-General.
3. The RTA shall prepare detailed Plans and Specifications for the construction of electro-static precipitators prior to the opening of the tunnel to traffic.
4. Should the results of monitoring required under Condition 75 and from the Community based monitoring station (referred to below) show that the PM₁₀ contributions from the exhaust stack results in exceedance of the goals specified in Condition 72, the RTA shall install electro-static precipitators within 6 months of the direction by the Director-General (or within other such time as agreed by the Director-General). The RTA shall establish a Protocol outlining procedures for deciding how an exceedance due to the stack will be determined. This Protocol, which is to be made publicly available, shall be developed in consultation with the EPA and the Air Quality Community Consultative Committee and require approval from the Director-General at least 3 months prior to opening the tunnel to traffic .
5. The RTA shall establish a mechanism regarding the potential for complaints about air quality impacts resulting from the stack. If complaints are received from areas where there is a reasonable potential for localised air quality impacts resulting from the stack, independent local monitoring of PM₁₀ shall be undertaken. Prior to undertaking localised monitoring, the timing and nature of the complaint shall be compared with corresponding in-stack (as specified below) and external monitoring to assess whether there is a reasonable correlation with stack emission levels. Any complainant not satisfied with the RTA's response may raise the concern with the Director-General whose decision on the need for monitoring shall be final. Should monitoring of PM₁₀ indicate localised exceedance of the goals as specified in Condition 72, the RTA shall immediately undertake such measures to meet the goals, mitigate the concerns of the resident(s) raising the complaint(s), or retro-fit electro-static precipitators
6. Subject to the agreement of the Air Quality Consultative Committee, the RTA shall, within six (6) months of this approval, provide all necessary funding for the establishment of a community based monitoring station to monitor PM₁₀, NO_x and CO. The RTA shall thereafter, on an annual basis, meet all operating costs associated with the station. The community based station is to operate independently from the RTA and all other authorities and its establishment and operation shall be overseen by the Air Quality Community Consultative Committee on behalf of the community. The establishment and operation of the station is to be undertaken in accordance with recognised Australian standards and undertaken by a consultant accredited by NATA. The results of the monitoring shall be

quality assured through a NATA accredited process prior to the data being considered as a basis for compliance/auditing purposes. The monitoring results shall be made publicly available. The need for continuation of the community based monitoring station shall be reviewed by the RTA in consultation with the EPA and the Air Quality Consultative Committee after a period of 3 years. Any recommendations resulting from this review shall require approval by the Director-General prior to implementation.

7. As part of the internal tunnel monitoring system specified in Condition 70, the RTA shall also continuously monitor PM_{10} and NO_x concentrations in the stack. The RTA shall also continuously monitor the temperature and volumetric flow-rate of ventilation air in the stack. The results shall be taken into account for the purposes of assessing compliance with Condition 72. This additional internal monitoring requirement shall be subject to the approval of the Director-General following consultation with the EPA and shall be in place prior to the operation of the tunnel.
8. The RTA shall further investigate, in consultation with the EPA, options of partial ventilation of tunnel emissions at the tunnel portals to achieve energy costs savings as well as more widespread dispersal of emissions. Irrespective of this requirement, any potential emissions from tunnel portals shall not result in ambient air quality near at the nearest residential properties to the portals exceeding the goals specified in Condition 72 nor a CO long term eight hour goal of 9 ppm.
9. The RTA shall develop to the satisfaction of the Director-General following consultation with the EPA and within 3 months of this approval, a matrix of emission concentrations (mg/m^3) for PM_{10} and NO_x and the corresponding volumetric flow rates (m^3/s) of ventilation air in the stack that are consistent with meeting the ambient air quality goals specified in Condition 72. *The tunnel ventilation system must be operated in such a manner that will ensure that the emission concentrations expressed as a function of volumetric flow rate of ventilation air will be met at all times.* Compliance with the emission concentrations and corresponding volumetric flow rates of ventilation air shall be determined in accordance with the continuous stack emissions monitoring required in Condition 73, Clause 7 above.
10. *The RTA shall also assess and report on the impacts of PM_{10} stack emissions at monitoring locations in terms of meeting an annual average goal of $30\mu g/m^3$.*
11. Issues relating to pollution control external to the tunnel during emergencies such as major fires, shall also be addressed in the Emergency Response Plan required under Condition 130.

Condition 70 and 71.

The independent verification by TEC is approved. The in-tunnel monitoring and reporting system shall be approved by the EPA when construction of the tunnel is completed.

Condition 74

This condition has been satisfied (in terms of making provisions for treatment systems) on the basis that there shall be no additional development (including subdivision) on the land where the stack is located without prior approval from the Director-General. The need for retro-fitting is deferred subject to ongoing performance evaluation and other issues as defined in Condition 74.

Condition 75

Stage 1 of the monitoring network has been approved. Completion of compliance with this condition would be finalised prior to the operation stage as required by the EPA.

Notwithstanding, results of hourly updated real-time monitoring of PM₁₀, NO₂ and CO at the approved monitoring locations shall be provided on the Internet and published regularly by other means acceptable to the Air Quality Community Consultative Committee. This data shall not be used as a basis for compliance/auditing purposes until the data has been quality assured by a NATA accredited consultant. The means and availability of this information shall be conveyed to the local community by way of newsletter and newspaper advertisement at least one month prior to the opening of the tunnel to traffic.

Condition 80

The AQMP shall specifically include a detailed assessment of a buy-back or replacement scheme offered to all owners of solid fuel heaters in the local air shed as part of the AQMP. The nature and extent of the buy-back scheme shall be developed in consultation with the EPA, relevant local Councils, and the Air Quality Consultative Committee. As part of the AQMP the RTA shall also undertake a detailed cost effectiveness comparison to assess the options for control of PM₁₀ and NO_x. The options shall include but not be limited to the solid fuel heater buy-back/replacement program, treatment options, the current ventilation stack, modifications to the current stack that would allow heightening of the plume during worst case conditions. The AQMP shall also include a detailed education and communication strategy.

Appendix 4

Answers to Questions on Notice

Answers to questions on notice

Friday, 15 November 2002

Planning NSW

1. Mr M Jones asked the Director General of PlanningNSW, Ms Susan Holliday—

(Relevant area in Hansard: p 52)

Can organic substances, monitored under condition 72 at sites T1 and T3, also be monitored inside the tunnel?

Answer:

Similar to requiring standards for short-term exposure to in-tunnel particulate matter, PlanningNSW has no statutory ability to require the RTA to monitor pollutants outside the requirements of the conditions of approval.

Notwithstanding, air quality inside the tunnel has been designed and operated around the CO goal. Understanding the relationships between CO and VOCs gives a general assurance that if the CO goals are met then so will the requirements for toxic compounds such as benzene and 1-3 butadiene.

Odourous compounds tend to be more related to an amenity issue. This would be more critical outside the tunnel particularly in regard to odour mediated effects.

Planning NSW has consulted with the Environment Protection Authority (EPA) and Department of Health for additional technical advice regarding the monitoring of VOCs in-tunnel.

The EPA has advised that it is not aware of any short-term exposure goals for these pollutants that could be applied to in-tunnel air quality. It should be noted that the volatile organic criteria identified in Condition 72 are design criteria for the purposes of assessing proposals for new emission sources or modifications to existing sources to be used in conjunction with modelling procedures. These criteria are based on the Victorian State Environment Protection Policy (Air Quality Management). They were included as design criteria for numeric modelling to ensure that the exhaust stack was designed so that emissions from the stack would result in acceptable odour and environmental impacts to the surrounding environment.

The three minute averaging period referred to in the condition relates to how they are used within the air dispersion modelling process and bears no direct relationship to appropriate short term exposure health-based goals for these pollutants.

Advice from NSW Health concurs with that provided by the EPA. NSW Health has advised that there is no feasible technology in current use to measure VOCs over short time periods. The shortest averaging period of which the Department is aware is the occupational 8 hour 5 parts per million (ppm) for benzene. There is no short term exposure limit. Toluene has a short term exposure limit of 150 ppm over 15 minutes, however it is not known how this is measured as there is no continuous methodology that NSW Health is aware of.

2. Mr R Jones asked the Director General of PlanningNSW, Ms Susan Holliday—

(Relevant area in Hansard: p 57)

What is PlanningNSW doing to regulate the situation to ensure that those using the tunnel at least twice a day, particularly motorcyclists, are not being exposed to above the ambient air quality standard of 50 micrograms per cubic metre?

Answer:

There are a number of issues with the establishment of an in-tunnel goal for particulate matter:

1. There are no short-term standards anywhere in the world for particulate matter. There are shorter term (i.e. 8-hour) Australian Occupational Health and Safety standards for certain particles such as carbon black (3,000 µg/m³) and airborne particles (10,000 µg/m³). These exposure levels are significantly higher than the PM10 standard (50µg/m³), however these are unlikely to be directly applicable anyway as they are not based on particles containing potentially toxic substances.
2. The approach for establishing any new standards must have appropriate scientific and health investigations and support. For example the consideration of a standard for PM2.5 has required considerable and extensive consultation and debate.
3. The approval authority is not in a statutory position to change the conditions even if a new standard was developed. This would require the Proponent (RTA) to initiate.
4. Equity issues may also need to be considered about the application of a short-term standard for particulates outside the tunnel and the implications need to be understood.
5. The example given by the Chairman of a particulate matter concentration in the tunnel of 1500 ug/m³ with an exposure over 7 minutes (ie average time spent in the tunnel) and a trip through teh tunnel twice in one day would equate to a 24-hour time weighted average exposure to PM10 of around 14ug/m³. This is well below the goal of 50ug/m³.

3. Mr R Jones asked the Director General of PlanningNSW, Ms Susan Holliday—

(Relevant area in Hansard: p 58)

Can you confirm the source of the information on page 16 of the Department's submission which states that 24 tunnels in Japan have filters, in light of advice given to the Committee that up to 41 of long tunnels in Japan have filters?

Answer:

Specific information available to PlanningNSW indicates that there are 20 tunnels in Japan that have ESPs. These are listed below:

- Enasan
- Gorigamine
- Hanna
- Happuzan
- Higo
- Kanmon
- Keihinjima
- Koshirazu

- Nihonzaka
- Ryu-ohzan
- Sekido
- Suginami-ku
- Tachitohge
- Takanomine
- Tennohzan
- Tokyo Bay (TTB)
- Toroyama
- Turuga
- Uji

However PlanningNSW is aware of statements by the RTA in its Report on International Developments in Emission Treatment Systems that there are 24 “or as many as 27”. Accordingly PlanningNSW identified 24 in its submission.

It is noted that in listing the Japanese tunnels, various reports provide different spelling which could lead to double counting. For example there is Turuga and Tsyruqa, also Hanna and Han-Na, Ryuosan and Ryu-ohzhan etc. Some lists also separate the carriageways (ie Tennohzan west and Tennohzan east).

At this stage PlanningNSW does not have any written evidence that supports the Chairman’s statement that there are 41 tunnels with ESPs in Japan but would be appreciate if any further information if available that substantiates the 41.

Additional information provided by PlanningNSW

We reiterate Mr Hather’s comments from pages 49 and 50 of the transcript regarding this matter. Whilst the Department has considered the benefits of filters for the internal environmental, the main driver for in-tunnel air quality has been carbon monoxide (CO). In-tunnel filters may reduce particulate levels within the tunnel which would result in improved visibility. However such filters would have no impact on the CO levels within the tunnel. Tunnel exhaust velocities are determined by the CO levels and the need to maintain these at acceptable levels (within stated goals).

NSW Environment Protection Agency

Mr R Jones asked the Acting Director General, NSW Environment Protection Agency, Mr Joe Woodward—

(Relevant area in Hansard: p 36)

Please provide PM2.5 and PM 10 data for the Earlwood site for the same times of the year before and after the tunnel was opened.

Answer:

Copies of the data from the EPA’s Earlwood Monitoring Station are available from committee secretariat.

Road and Traffic Authority

1. **Mr R Jones asked the Chief Executive Officer, Roads and Traffic Authority, Mr Paul Forward—**

(Relevant area in Hansard: p 14)

What are the occupational health and safety standards for exposure to particulate matter such as benzene and formaldehyde within the tunnel?

Answer:

The National Occupational Health and Safety Council (NOHSC) Exposure Standards are:

Benzene: TWA: 5 ppm.

(TWA is Time Weighted Average exposure for an 8-hour day, 5 days per week)

STEL (Short-term exposure limit): Not stipulated.

Formaldehyde: TWA: 1 ppm.

STEL: 2 ppm, 2.5 mg/m³

2. **Mr Ryan asked the General Manager, Environment and Community Policy Officer, Roads and Traffic Authority, Ms Jay Stricker—**

(Relevant area in Hansard: p 20)

Why were measurements for PM_{2.5} at monitoring station U1 not made available by the RTA in response to Parliament's call for papers?

Answer:

PM_{2.5} data from Station U1 was lodged at the Legislative Council on 27 June 2002 in response to the Parliamentary Motion of June 2002. No such data was called for in the September 2002 Notice of Motion for further documents.

3. **Mr Jobling asked the Chief Executive Officer, Roads and Traffic Authority, Mr Paul Forward—**

(Relevant area in Hansard: p 25)

Can the RTA supply to the Committee, whether in confidence or not, legal advice they have received in relation to the EPA concerns specifically in relation to PlanningNSW and condition 70?

Answer:

The RTA's claim for legal privilege on advice lodged with the Legislative Council was upheld in Sir Laurence Street's report dated 25 October 2002.

4. **Mr Jobling and Mr R Jones asked the Chief Executive Officer, Roads and Traffic Authority, Mr Paul Forward—**

(Relevant area in Hansard: pp 26-27)

(1) Other than the Tokyo WanaquaLine, what other tunnels in Japan has the RTA examined?

- (2) How many of the long tunnels in Japan are filtered (The committee has been told that 41 out of 60 long tunnels are filtered)?

Answer:

- (1) The Wanaqualine tunnel is the only Japanese tunnel recently examined by RTA staff.
- (2) The RTA has engaged Consultants to advise in relation to the international developments in tunnel emission treatment systems as required by Condition 79 of the M5 East approval

5. Mr Ryan asked the Representatives of the Roads and Traffic Authority—

- (1) (a) What information is collected in regard to in-tunnel air quality in addition to information about the levels of carbon monoxide (CO)?
- (b) How is the data on air quality monitoring collected and recorded?
- (c) How much of this information is made public and in what form?

Answer:

- (1) (a) Nitrous oxide (NO) and visibility data.
- (b) CO, NO and visibility data are collected continuously by monitoring equipment within the tunnel and are recorded by the computer control systems.
- (c) The data is not publicly available.
- (2) (a) How many air quality monitoring sites are located within the M5 East tunnel/s?
- (b) Could you supply the Committee with details of their exact locations?

Answer:

- (2) (a) There are 8 monitors in the main (Bexley Road to Marsh Street) tunnel and 2 monitors in the Cooks River tunnel.
- (b) **MAIN TUNNEL (Bexley Road to Marsh Street)**

EASTBOUND

Description	Location (metres)	Monitor Number
Bexley Road Portal	7,185	-
Near Exhaust to Turrella	9,720	AQS 301
Near Princess Highway Off-ramp	10,150	ACO 301
Near Marsh Street Off-ramp	10,900	ACO 302
Near Eastern Ventilation Cross-over	11,020	AQS 302
Marsh Street Portal	11,140	-

WESTBOUND

Description	Location (metres)	Monitor Number
Marsh Street Portal	11,140	-
On Marsh Street on-ramp	Near mid-point of ramp	ACO 604
Near Eastern Ventilation Cross-over	10,895	ACO 403
Near Duff Street Air-intake	9,785	AQS 403
Near Western Ventilation Cross-over	7,380	AQS 404
Bexley Road Portal	7,197	-

COOKS RIVER TUNNEL**EASTBOUND**

Description	Location (meter)	Monitor Number
Western Portal	11,850	-
Near Eastern portal	12,370	AQS 305
Eastern Portal	12,400	-

WESTBOUND

Description	Location (meter)	Monitor Number
Eastern Portal	12,400	-
Near Western portal	11,880	AQS 406
Western Portal	11,850	-

- (3) The EPA told us that there were measurements taken for PM 2.5 at monitoring station U1.
- (a) Is this information correct?
- (b) If so why was this information not made available in response to the call for papers initiated by motion of the Legislative Council?

Answer:

- (3) (a) Yes.
- (b) Refer Question 2 above.
- (4) If information for PM 2.5 levels within the M5 East Tunnel have been collected, could this information now be provided to the Committee?

Answer:

- (4) PM2.5 data is not recorded within the tunnel.
- (5) Have there been any further exceedances in CO levels within the tunnel, above 87ppm (including those measured for periods of time less than 15 minutes) during October and November that have not yet been reported to the Committee?

Answer:

- (5) There have been no exceedances of the CO goal in the M5 East Conditions of Approval or of the reportable CO levels during October or November 2002.
- (6) I note that a letter from Mr Sam Haddad, Executive Director of PlanningNSW, to Mr Paul Forward, CEO of the Roads Traffic Authority dated 12 September 2002 requesting the RTA to notify all carbon monoxide exceedances above the level of 200 ppm (3 minute average) within 24 hours.
- (a) Is the RTA complying with this request now?
- (b) If so, have there been any incidents of CO levels at 200ppm recorded in the tunnel since September 2002?

Answer:

- (6) (a) Yes.
- (b) No.
- (7) The WHO recommends more stringent levels of CO concentrations for periods of exposure greater than 15 minutes. They include recommended limits of exposure to less than 50ppm for a period of 30 minutes, and levels not exceeding 13ppm for exposure periods for one hour.
- (a) Are records kept which provide details as to when CO levels in the tunnel might exceed these limits?
- (b) If so, how often do CO levels exceed these limits?

Answer:

- (7) (a) No. The WHO 15-minute CO goal of 87 ppm is monitored and recorded as required by the Conditions of Approval.
- The WHO 15-minute goal stipulates a more stringent exposure criterion (1305 ppm.minutes) than the WHO 30 or 60 minute exposure criteria (1500 ppm.minutes)
- The WHO 1 hour (60 minute) goal is 25 ppm, not 13 ppm, as stated in the question.
- As motorists using the M5 East tunnel were subject to CO exposure less than the 15-minute goal when readings above 87 ppm (15-minute average) occurred, their exposure was also less than the other WHO exposure goals quoted.
- (b) Not applicable. Refer to above comments.
- (8) (a) How many households have been paid a rebate under of the wood stove buy back scheme?
- (b) How many with wood stoves have been removed from the area within a 5 km radius of the M5 East stack?

Answer:

- (8) (a) The buy back scheme applies to home heaters, rather than stoves.

To 28 November, 7 applicants had received a rebate cheque from the scheme.

- (b) The RTA believes that 6 of the households to whom rebate cheques have been paid are within 5 Kms of the stack. The 7th home appears to be marginally beyond 5 Kms from the stack.
- (9) (a) How much electrical power annually is now required to run the ventilation system within the M5 East tunnel and exhaust stack given that there have been significant upgrades to the fans, which are now used in the tunnel?
- (b) What is its approximate retail value?

Answer:

- (9) (a) The Contractor replaced the bearings on all 16 axial fans at no cost to RTA to allow their original design life to be achieved. There has been no "upgrades to the fans".

The RTA does not have access to the Contractor's costing system and does not have access to the annual power charges for the ventilation system.

NSW government policy to preserve the integrity of tendering processes allows the public disclosure only of the total contract sum. The cost of individual items that make up that contract sum cannot be disclosed. The privileged nature of this information was acknowledged by Sir Laurence Street in his report dated 25 October 2002 in relation to documents submitted to the Legislative Council during September 2002.

- (b) As stated above, the RTA does not have access to such "commercial-in-confidence" information.
- (10) The table documents include a number of references to a procedure for responding to "incidents" in the tunnel with various traffic management strategies, which appear to range from various levels including reduced speed limits, lane closures and "closing down a tube". I draw your particular attention to a procedure referred in the documents tabled as "Incident Plan for Tunnel Degraded Air (PR - IMP -007)".
 - (a) What is the status of these plans?
 - (b) How did they come to be drafted?
 - (c) How frequently have they been implemented at their various levels?

Answer:

- (10) (a) The procedures are part of the Contractor's Incident Response Plans for the project
- (b) These plans are part of the Emergency Planning required by Condition 130 of the M5 East Conditions of Approval.
- (c) Some details in this regard are given in Baulderstone Hornibrook's submission to the November 2002 Inquiry under the heading "Minimal Incidents and Impact on Motorists."

The Contractor BHBB provides this data to RTA each quarter in a report marked as "Commercial-in-Confidence." In his report dated 25 October 2002 in relation to documents lodged with the Legislative Council during September 2002, Sir Laurence Street upheld the privileged nature of this information in accordance with schedule 3 of the Premier's memorandum 2000-11.

- (11) I also note that some of the procedures outlined in the tabled flowchart refer to a requirement to obtain approval from the RTA.

Has approval been sought from the RTA for the implementation of any of these procedures in response to degraded air quality incidents within the M5 East tunnel?

Answer:

On one occasion on 19 April 2002.

Following that occasion, the revision of procedure PR IMP 007 carried out in consultation with the Emergency Services Liaison Committee (Police, Fire Brigades, Ambulance, Department of Emergency Services and RTA Traffic Management) replaced the words "RTA approval" with "RTA notification."

NSW Health

Mr Ryan asked the Representatives of the Roads and Traffic Authority—

- (1) You have said that there is no goal for short-term exposure to high concentrations of particulates. It has been suggested to the committee that some workplace goals for exposure to particulates would represent a suitable goal to be applied to the air quality inside the tunnel.
- (a) Are there any goals are used by agencies such as WorkCover as guidelines for exposure to concentrate on level of air particulates?
- (b) If so could you supply details?

Answers:

Worksafe Australia has standards for airborne particulates, however they are not very useful for this setting. Exposure standards are provided for classes of particles such as silica, asbestos and synthetic mineral fibres. For "dusts not otherwise classified" the standard notes:

- Not all dusts have assigned exposure standards. However it should not be assumed that these unlisted dusts do not represent a hazard to health.
- Where no specific exposure standard has been assigned and the substances is both of inherently low toxicity and free from toxic impurities, the recommended exposure standard for dust in general should be 10mg/cubic metre (for particles less than 10 microns - averaged over an 8 hour working day). However this general exposure standard should not be applied where the particulate material contains other substances which may in themselves be toxic or cause physiological impairment at lower concentrations. In such circumstances the exposure standard for the more toxic components should be applied.
- Regarding toxic substances that may be present in motor vehicle emissions, the Worksafe standards provide s short-term limit for:
 - toluene 150ppm
 - nitrogen dioxide 5ppm
 - carbon monoxide 400ppm

As noted in our evidence to the committee, NSW Health is not aware of any standards in Australia or internationally that are specifically for the short-term effects of fine particles.

- (2) Your presentation to the committee referred to the WHO 15 minute goal for exposure to carbon monoxide (CO), which has been included as part of the approval conditions by Planning NSW. There has been some controversy between the EPA and the RTA as to the appropriate interpretation of this condition. In short this controversy is between the view of the EPA which has suggested that Condition 70 relates to a single point exposure and the view of the RTA who believe that a breach of this condition is only triggered in the event when levels are exceeded during a period when people are actually in the tunnel for a period of 15 minutes. While I recognize that this matter is largely a legal one, which interpretation of the standard would Health NSW recommend for application to future tunnel projects?

In asking this question, I draw your attention to a briefing prepared by Ms Penny Finlay of the EPA dated 5 June 2002, which reports that "NSW Health is concerned that levels of traffic congestion may result in exposures of greater than the "safe" limit of 15 minutes."

Answer:

NSW Health recommends that the WHO exposure guidelines are applied to ensure that human exposure does not exceed the guidelines.

- (3) What is the purpose or value of the "in tunnel" study NSW Health is conducting in the absence of a standard for short-term exposure to particulates?

Answer:

For this study we are collecting a number of pollutants - carbon monoxide, nitrogen dioxide and toluene have short-term time-averaged goals for comparison. Levels of fine particles and benzene will be indicative only, but may be usefully compared between ventilation scenarios.

In previous work on benzene exposure for the National Environmental Health Forum, total benzene exposure was estimated, with a portion of exposure attributed to commuting. The information gained in this study may also be usefully applied to a composite picture of total personal exposure to benzene.

- (4) I refer to a copy of an e-mail forwarded from Ms Penny Findlay, Principal Officer, Sydney Region Planning EPA, dated 25 Jul 2002, stating that:

"Operations and Air Policy have just met with NSW Health (Vicky Sheppheard A/Manager Environmental Health) who informed us that she will be advising for executive ASAP that based on the unexplained symptoms being reported by M5 East residents NSW Health cannot give assurances about the health effects around any other stacks. This may mean that approvals should be delayed for CCT and LCT. She told us that they are expecting very soon the report being collated by Dr Peter Best for RAPS about the health symptoms and correlations against reported air monitoring. She will review this data and determine if NSW Health needs to conduct its own study."

- (a) Did Ms Sheppheard ever advise her executive in the terms described in the e-mail after 25 July 2002?
- (b) What advice is NSW Health currently providing in regard to the Cross City Tunnel and the Lane Cove Tunnel in regard to health impacts?
- (c) Has Health NSW received any information, which would cause them to question the health impacts of unfiltered long road tunnels?
- (d) Has Health NSW reviewed information from Dr Peter Best and determine whether NSW Health needs to conduct its own study?

Answers:

I would first like to provide the NSW Health understanding of this outcome of this meeting. Dr Sheppheard undertook to discuss with the executive the implications of the health complaints around

the M5 Stack for further tunnel projects. This issue was discussed at a meeting on July 29. It was decided that as there was no evidence from air quality monitoring that the health complaints were likely to be due to the stack emissions, there was no reason to divert from the current review and approval process. It was also agreed that further investigation of these complaints was warranted, but until and unless investigations demonstrated a tack impact, there need be no change in policy.

Consequently, NSW Health is evaluating potential health impacts from the Cross City and Lane Cove Tunnels by reviewing modelled predictions of pollutant levels at residential locations against current exposure levels, in the light of established dose-response effects or health-based standards.

NSW Health has not received any advice that would cause question of unfiltered long road tunnels, more than other sources of motor vehicle pollution.

NSW Health has reviewed Dr Best's work. As described in our evidence NSW Health is planning its own study.

Balderstone - Hornibrook

Mr Ryan asked the Chairman of Balderstone-Hornibrook, the Hon Nick Greiner—

- (1) (a) What information is collected in regard to in-tunnel air quality in addition to information about the levels of carbon monoxide (CO)?
- (b) How is the data on air quality monitoring collected and recorded?
- (c) How much of this information is made public and in what form?

Answer:

- (1) (a) Nitrous oxide (NO) and visibility data.
 - (b) CO, NO and visibility data are collected continuously by on-line monitoring equipment with the tunnel and are recorded by the computer control systems.
 - (c) The data is not made public.
- (2) (a) How many air quality monitoring sites are located within the M5 East tunnel/s?
 - (b) Could you supply the Committee with details of their exact locations?

Answer:

- (2) (a) There are 8 monitors in the main (Bexley Road to Marsh Street) tunnel and 2 monitors in the Cooks River tunnel.
- (b) **MAIN TUNNEL (Bexley Road to Marsh Street)**

EASTBOUND

Description	Location (metres)	Monitor Number
Bexley Road Portal	7,185	-
Near Exhaust to Turrella	9,720	AQS 301
Near Princess Highway Off-ramp	10,150	ACO 301
Near Marsh Street Off-ramp	10,900	ACO 302
Near Eastern Ventilation Cross-over	11,020	AQS 302
Marsh Street Portal	11,140	-

WESTBOUND

Description	Location (metres)	Monitor Number
Marsh Street Portal	11,140	-
On Marsh Street on-ramp	Near mid-point of ramp	ACO 604
Near Eastern Ventilation Cross-over	10,895	ACO 403
Near Duff Street Air-intake	9,785	AQS 403
Near Western Ventilation Cross-over	7,380	AQS 404
Bexley Road Portal	7,197	-

COOKS RIVER TUNNEL**EASTBOUND**

Description	Location (meter)	Monitor Number
Western Portal	11,850	-
Near Eastern portal	12,370	AQS 305
Eastern Portal	12,400	-

WESTBOUND

Description	Location (meter)	Monitor Number
Eastern Portal	12,400	-
Near Western portal	11,880	AQS 406
Western Portal	11,850	-

- (3) The EPA told us that there were measurements taken for PM 2.5 at monitoring station U1. Is this information correct?

Answer:

- (3) Yes.

- (4) If information for PM 2.5 levels within the M5 East Tunnel have been collected, could this information now be provided to the Committee?

Answer:

- (4) PM_{2.5} data is not recorded within the tunnel.

- (5) Have there been any further exceedances in CO levels within the tunnel, above 87ppm (including those measured for periods of time less than 15 minutes) during October and November that have not yet been reported to the Committee?

Answer:

- (5) There have been no exceedances of the CO goal in the M5 East Conditions of Approval or of the reportable CO levels during October or November 2002.

- (6) The WHO recommends more stringent levels of CO concentrations for periods of exposure greater than 15 minutes. They include recommended limits of exposure to less than 50ppm for a period of 30 minutes, and levels not exceeding 13ppm for exposure periods for one hour.
- (a) Are records kept which provide details as to when CO levels in the tunnel might exceed these limits?
- (b) If so, how often do CO levels exceed these limits?

Answer:

- (6) No. As required by the Conditions of Approval the WHO 15-minute CO goal of 87 ppm is monitored and recorded.

Any employee required to work within the tunnel during maintenance or emergencies are required to work in accordance with the appropriate management plans.

- (7) (a) How much electrical power annually is now required to run the ventilation system within the M5 East tunnel and exhaust stack given that there have been significant upgrades to the fans which are now used in the tunnel?
- (b) What is its approximate retail value?

Answer:

- (7) (a) There has been no "significant upgrades to the fans". Bearings on all 16 axial fans have been replaced to achieve the specified design life.
- (b) Commercial-in-confidence information not to be disclosed.

- (8) The table documents include a number of references to a procedure for responding to "incidents" in the tunnel with various traffic management strategies, which appear to range from various levels including reduced speed limits, lane closures and "closing down a tube". I draw your particular attention to a procedure referred in the documents tabled as "Incident Plan for Tunnel Degraded Air (PR - IMP -007).
- (a) What is the status of these plans?
- (b) How did they come to be drafted?
- (c) How frequently have they been implemented at their various levels?

Answer:

- (8) (a) The incident response procedures are contained in the Incident Management Plan (IRP) forming part of the Operations and Maintenance Manual for the project.
- (b) These plans are part of the Emergency Planning required by Condition 130 of the M5 East Conditions of Approval. The IRP was drafted in consultation with the Emergency Services Liaison Committee (including Police, NSW Fire Brigade, Ambulance, SES, RTA, and BHEgis).
- (c) Details are given in our submission to the Inquiry under the heading "Minimal Incidents and Impact on Motorists."
- (9) I also note that some of the procedures outlined in the tabled flowchart refer to a requirement to obtain approval from the RTA. Has approval been sought from the RTA for the implementation of any of these procedures in response to degraded air quality incidents within the M5 East tunnel?

Answer:

- (9) On one occasion on 19 April 2002. Subsequent revision of procedure PR IMP 007 replaced the words "RTA approval" with "RTA notification."
- (10) What action has been taken by the tunnel operators to meet the requirements of the Occupational Health and Safety Regulation 2001, specifically with respect to the identification (sec. 9), risk assessment (s.10), control (s. 51), and monitoring (s.55) of atmospheric contaminants?

Answer:

Boulderstone Hornibrook and in particular BHEgis is fully aware of its obligations and responsibilities imposed on it by the *Occupational Health and Safety Act 2000* and the *Occupational Health and Safety Regulation 2001*. Two key documents form the basis of the care, control and management of the tunnel to ensure the health and safety of tunnel users and tunnel maintenance workers. These are:

- (i) M5 East Occupational Health and Safety Plan; and
- (ii) M5 East Environmental Management Plan.

Both Plans are subject to continuous review.

The health and safety of tunnel workers is assured through the implementation of the M5 East Work Permit System which is contained in the OH&S Plan. This system ensures that work which constitutes an environmental, safety or health hazard is not carried out without an approved work permit issued by BHEgis. An approved work permit must identify all hazards, precautionary and control measures. These must be observed by all personnel who work in the tunnel.

The Work Permit System specifies a number of measures to manage situations where air quality may be an issue for concern:

- A ventilation plan is implemented in response to an in-tunnel incident requiring attendance by BHEgis workers and/or emergency services;
- Motorist whose vehicles become stationary in the tunnel for prolonged periods are advised to leave the tunnel with an escort;
- General maintenance within the tunnel is scheduled between 9pm and 5am, corresponding to periods of low traffic volumes (and vehicle emissions) or when tunnel closures are put in place. The ventilation of the tunnel is operated such that CO is maintained below the 30ppm 8 hour goal (with a corresponding reduction in other airborne contaminants); and
- All work teams are required to carry gas monitors, which are preset to advise when exposure standard are approached.

GPSC 4 Budget Estimates Inquiry: Questions taken on notice during supplementary hearing 23 October 2002

1. **Mr Cohen asked the Minister for Transport, and Minister for Roads, the Hon Carl Scully, MP—**

(Relevant area in Hansard: page 2-3)

- (1) What does it cost to run the ventilation system for the M5, in excess of \$ 3 million per annum or in excess of \$3.5 million per annum?
- (2) By what quantity does the over ventilation reduce the pollution inside the tunnel?

(Relevant area in Hansard: page 4)

- (3) How many people have taken up the 2001 property value guarantee?
- (4) How many requests has the RTA had for relocation from residents around the M5 stack?

(Relevant area in Hansard: page 6)

- (5) When are the fans turned off and how often?
- (6) Can specific peak hour times be monitored rather than the current monitoring of averages over a 24 hour period?
- (7)
 - (a) Is the tunnel turned closed to traffic when the fans are turned off
 - (b) Do cars and vehicles pass through the tunnel when repairs are being undertaken and the fans are turned off?

(Relevant area in Hansard: page 7)

- (8) Has there been formal permission from PlanningNSW regarding condition 71 and portal emissions during emergencies?
- (9) Is monitoring of air quality for particles CO and NO₂ at the portals averaged out over a 24-hour period?

(Relevant area in Hansard: page 12)

- (10) In measuring breaches and exceedances for CO levels is measurement taken for the entirety of the tunnel or at just one spot?

(Relevant area in Hansard: page 15)

- (11) Have there been any exceedances of condition 71 at the portals?

2. Mr Lynn asked the Minister for Transport, and Minister for Roads, the Hon Carl Scully, MP—

(Relevant area in Hansard: page 7)

- (1) Do you have written quotes from manufacturers that guarantee removal of 95% of particulates down to 0.3 of a micron?

(Relevant area in Hansard: page 13)

- (2) How many complaints have been received by the RTA, EPA and NSW Health about conditions in the tunnel?
- (3) How many complaints have been received by the RTA, EPA and NSW Health about conditions outside the tunnel?

3. Mr R Jones asked the Minister for Transport, and Minister for Roads, the Hon Carl Scully, MP—

(Relevant area in Hansard: page 9)

- (1) Are you aware that lanes are closed every day, twice a day, to meet condition 70?

(Relevant area in Hansard: page 13)

(2) How many breakdowns in the tunnel are there every month?

4. Mr Oldfield asked the Minister for Transport, and Minister for Roads, the Hon Carl Scully, MP—

(Relevant area in Hansard: page 10)

Is it correct that only 3 people had taken up the wood and coal burner buyback offer by 7 October 2002?

Answers to these questions are now available on the GPSC No. 4 website via www.parliament.nsw.gov.au

Appendix 5

Minutes of the Proceedings

Minutes

Minutes No. 84

Thursday 24 October 2002 at 1:05pm

Room 1108, Parliament House.

1. Members Present

The Hon Richard Jones MLC (*Chair*)
Ms Jan Burnswoods MLC (*Deputy Chair*)
The Hon Rick Colless MLC
The Hon Amanda Fazio MLC
The Hon John Jobling MLC
The Hon Malcolm Jones MLC
The Hon Peter Primrose MLC (*Saffin*)

2. Apologies

The Hon Janelle Saffin MLC

3. Substitutions

The Chair advised that Mr Primrose as Government Whip had advised him that for this and future GPSC 5 meetings he would substitute for Ms Saffin.

4. Confirmation of draft minutes

Resolved, on the motion of Ms Fazio, that minutes numbers 82 and 83 be confirmed.

5. *****6.** *****7. Inquiry into M5 East Ventilation Stack (2002)*****Terms of Reference***

The Clerk advised the Committee of correspondence received from Mr Colless, Mr Jobling and Mr R Jones dated 16 October 2002 requesting that a meeting of the committee be convened to consider proposed terms of reference for a new inquiry into aspects of the M5 East ventilation stack.

The Committee deliberated.

Resolved, on the motion of Mr Jobling:

1. *That General Purpose Standing Committee No 5 inquire into and report upon:*
 - (a) *the implementation of the recommendations of the General Purpose Standing Committee No. 5 report on the 2001 Inquiry into the M5 East Ventilation Stack;*
 - (b) *health and safety risks for people using the M5 East tunnel, including fire risk and risk to commercial drivers and tunnel operators;*
 - (c) *air quality and health impacts for residents, workers and businesses around the tunnel stack and tunnel entrances/exits;*
 - (d) *adequacy of conditions of approval, air quality and monitoring provisions and enforcement;*
 - (e) *viability of different systems for filtration and treatment of tunnel emissions; and any other relevant matters.*
2. *That the Committee present a report by 5 December 2002.*

Closing date for submissions

Resolved, on the motion of Mr Primrose, that the closing date for submissions be 11 November 2002.

Newspaper Advertisements

Resolved, on the motion of Mr Primrose, that the Chair be authorised to place advertisements calling for submissions in the St George & Sutherland Shire Leader, Canterbury-Bankstown Express, Bankstown-Canterbury Torch and Cooks Valley River Times.

That the Chair write to key government agencies and other stakeholders inviting them to make submissions.

Hearing Schedule

The Committee deliberated.

Resolved, on the motion of Mr Primrose, that the Committee hold two hearings on the 11, 15 or 18 of November 2002.

Concerns were expressed as to the security of members based upon experiences of previous hearings on this issue. The Clerk Assistant Committees requested the co-operation of all Committee members with any arrangements made by the secretariat.

Resolved, on the motion of Mr Primrose, that the Committee conduct a site visit of the stack and that arrangements be made to ensure security of members during the visit.

Mr Jobling as Opposition Whip tabled advice that for the remainder of the inquiry Mr Ryan would substitute for Mr Colless.

8. Adjournment

The meeting adjourned at 2:30 pm *sine die*.

Steven Reynolds
Clerk to the Committee

Minutes No. 85

Monday, 11 November 2002 at 10:00am
Control Room, M5 East Motorway Control Centre

1. Members Present

The Hon Richard Jones MLC (*Chair*)
The Hon John Jobling MLC
The Hon Malcolm Jones MLC
The Hon Peter Primrose MLC
The Hon John Ryan MLC

2. Apologies

Ms Jan Burnswoods MLC
The Hon Amanda Fazio MLC

3. Inquiry into M5 East Ventilation Stack (2002) – Site visits and Briefings

10.00am: M5 East Motorway Control Centre.

Present: Mr John Battalgia, Acting General Manager BHBEGis; Mr David Stuart-Watt, Manager Client Services, Roads and Traffic Authority.

Meeting adjourned at 10.30am to travel through the M5 East tunnel, accompanied by Mr Battalgia and Mr Stuart-Watt.

10.55am: M5 East Ventilation Stack, Turella.

Present: Mr Battalgia; Mr Stuart-Watt; Mr Peter Hejtmanek, BHJBBegis.

The Committee inspected the M5 East Ventilation Stack site and the exhaust fans housed within the ventilation building.

11.15am: The committee met with Mr Mark Curran and Ms Giselle Mawer, Residents Against Polluting Stacks (RAPS). The Committee inspected a number of sites accompanied by Mr Curran and Ms Mawer.

11.30am: The committee viewed the Ventilation Stack and surrounding areas from the Duff Street vantage point.

11.45am: The committee viewed the tunnel portal and surrounding area at the Kingsgrove Ave end of the M5 East tunnel.

12.00pm: The committee viewed the Wavell Parade monitoring station, and were then admitted to the home of a local resident.

4. Adjournment

The committee adjourned at 12.25pm until 9.45am on Friday 15 November 2002 at Parliament House.

John Young
Senior Project Officer

Minutes No. 86

Friday 15 November 2002 at 9:45 am
Jubilee Room, Parliament House

1. Members Present

The Hon Richard Jones MLC (*Chair*)
The Hon John Jobling MLC
The Hon Malcolm Jones MLC
The Hon Peter Primrose MLC
The Hon John Ryan MLC
Ms Jan Burnswoods MLC
The Hon Amanda Fazio MLC

2. Previous Minutes

Resolved, on the motion of Ms Burnswoods, that minutes numbers 84 & 85 be confirmed.

3. *****4. Inquiry into M5 East Ventilation Stack (2002)*****Publication of Submissions***

The Chair tabled, in addition to those previously circulated to the Committee, submissions received from Rockdale City Council and Ms Lidia Morawska, Queensland University of Technology.

Resolved on the motion of Ms Burnswoods, that all the submissions be accepted by the Committee.

Resolved, on the motion of Mr Primrose, that pursuant to the provisions of section 4 of the *Parliamentary Papers (Supplementary Provisions) Act 1975* and under the authority of Standing Order 252, the Committee authorises the Clerk of the Committee to publish the submissions received to date, except those for which confidentiality has been requested.

Correspondence

The Chair tabled the following correspondence:

Incoming:

- Email from Ms Mawer, RAPS, dated 13 November 2002 requesting permission for non-accredited media to film hearing.
- Letter from Hon Bob Debus MP, Minister for Environment, dated 11 November 2002 regarding liaison person from the EPA.
- Email from LGA, to Committee Chair dated 13 November 2002 indicating the position of the Local Government and Shires Association on the M5 East.
- Email from Mr Gartrell, Director, Corporate and Industrial Affairs, Baulderstone-Hornibrook, dated 14 November 2002, advising waiver of commercial-in-confidence status of their submission.

Outgoing:

- Letter from Chair to Minister for Transport, the Hon Carl Scully MP, dated 8 November 2002 inviting him to attend hearing.

Resolved, on the motion of Ms Burnswoods, that the correspondence be accepted.

Request by Ms Mawer of RAPS for non-accredited media representative

The Committee deliberated.

Resolved, on the motion of Ms Burnswoods, that the request to film the hearings in their entirety not be agreed to, but that permission be given for the RAPS representative to film five minutes of non-audio footage at the beginning of today's hearing and five minutes of non-audio footage at the beginning of the evidence by RAPS on Monday.

First Hearing

The public, the media and witnesses were admitted.

The Chair made an opening statement drawing attention to the broadcasting guidelines and matters relating to security.

Ms Anne Gotis, Mr Peter Snepvangers, Mrs Magda Danz and Mr Walter Forrester, local residents affected by the M5 Ventilation Stack, were sworn and examined.

Mr Snepvangers tendered:

- A number of documents relating to air quality and its health impacts, and a letter of resignation from Peter Snepvangers to the Air Quality Community Consultative Committee.

Resolved, on the motion of Ms Fazio, that the documents be accepted by the Committee.

Mrs Danz tendered:

- A number of documents relating to her health problems since the M5 East tunnel began operation.

Resolved, on the motion of Ms Fazio, that the documents be accepted by the Committee. (Subsequently, on the request of Mrs Danz, the Committee returned the original documents to Mrs Danz and retained copies.)

Evidence concluded and the witnesses withdrew.

Dr Peter Best, Air Quality Scientist for Katestone Environmental, was sworn and examined.

Dr Best tendered:

- A report by Katestone Environmental entitled "Summary of Complaint Log information for the period from 24/1/02 to 30/6/02 for Earlwood and Turrella Residents
- two articles on the impact of bushfires on air quality

Resolved, on the motion of Ms Fazio, that the documents be accepted by the Committee.

Evidence concluded and the witness withdrew.

Mr Noel Child, consulting engineer, was sworn and examined.

Evidence concluded and the witness withdrew.

Mr Joe Woodward, Acting Director-General, Mr Michael Crowley, Manager, Sydney Planning, Ms Penelope Finlay, Principal Policy Officer, and Mr Christopher Eiser, Director of Atmospheric Science, from the Environmental Protection Authority, were sworn and examined.

The Chair indicated that questions on notice might be submitted by the Committee; Mr Woodward indicated the agency would take further questions.

Evidence concluded and the witnesses withdrew.

Ms Sue Holliday, Director-General, Mr Sam Haddad, Executive Director, and Mr Mark Hather, Team Leader, Transport and Telecommunications, from the PlanningNSW were sworn and examined.

Mr Jobling tabled:

- correspondence from Mr S Schumbach, PlanningNSW to Mr P Gallagher, RTA dated 19 June 2002 regarding closure of the tunnel.
- correspondence from Mr S Haddad, PlanningNSW to Mr P Forward, RTA dated 12 September 2002 regarding closure of the tunnel.

The Chair indicated that questions on notice might be submitted by the Committee; Ms Halliday indicated PlanningNSW would take further questions.

Evidence concluded and the witnesses withdrew.

Resolved, on the motion of Mr Ryan, that pursuant to the provisions of section 4 of the *Parliamentary Papers (Supplementary Provisions) Act 1975* and under the authority of Standing Order 252, the Committee authorises the Clerk of the Committee to publish the transcript of the hearing and any documents tabled during the hearing, except those for which confidentiality has been requested.

That in view of the short time frame for this inquiry the Committee Clerk be authorised to put the uncorrected version of the published transcript on the Committee's website, with appropriate disclaimers.

5. Adjournment

The committee adjourned at 4:45pm until 9.00am on Monday 18 November 2002 at Parliament House.

Steven Reynolds

Clerk to the Committee

Minutes No. 87

Monday 18 November 2002 at 9:00 am
Jubilee Room, then room 814/815, Parliament House

1. Members Present

The Hon Richard Jones MLC (*Chair*)
The Hon John Jobling MLC
The Hon Malcolm Jones MLC
The Hon Peter Primrose MLC (morning)
The Hon John Ryan MLC
Ms Jan Burnswoods MLC
The Hon Amanda Fazio MLC (afternoon)

2. Inquiry into M5 East Ventilation Stack (2002)

Second Hearing

The public, the media and witnesses were admitted.

The Chair made an opening statement drawing attention to the broadcasting guidelines and matters relating to security.

Mr Nicholas Greiner, Chairman, Boulderstone-Hornibrook, Mr David Tucker, Operations and Maintenance Manager, BHEgis, Mr Craig Burrell, Associate, Hyder Consulting, were sworn and examined.

Evidence concluded and the witnesses withdrew.

Mr Paul Forward, Chief Executive Officer, Mr Gary Humphrey, General Manager, Motorway Services, Mr Phillip Gallagher, Motorway and Tollway Operations Manager, and Ms Jay Stricker, General Manager, Environmental & Community Policy, Roads and Traffic Authority, were sworn and examined.

Mr Ryan tabled the following documents:

- BHEgis document dated 11 April 2001 re procedure for dealing with degraded air quality
- Memo from P Gallagher to D Tucker and J Stricker dated 20 August 2002 re Hyder Draft Report
- Draft report by Connell Wagner Pty Ltd dated 29 October 2001 re use of electrostatic precipitators on the M5
- BHEgis Guidelines for Moveable Barrier Operation on M5 East

Mr Forward refused to answer a question from Mr Ryan, claiming privilege. The Chair upheld the claim of privilege.

The Chair indicated that questions on notice might be submitted by the Committee.

Evidence concluded and the witnesses withdrew.

Dr Peter Manins, Chief Research Scientist, Atmospheric Pollution Program, from the CSIRO was sworn and examined.

Evidence concluded and the witness withdrew.

Dr Greg Stewart, Chief Health Officer, Dr Stephen Corbett, Director Environmental Protection, and Dr Vicky Sheppard, Acting Associate Director, Environmental Health Branch, NSW Health were sworn and examined.

Dr Sheppard tendered an article by Dr S Schiffman regarding the potential health effects of odours.

Evidence concluded and the witnesses withdrew.

The hearing adjourned and resumed in Meeting Room 814/815.

Dr Kerry Holmes, Air Quality Scientist, Holmes Air Sciences, was sworn and examined.

Evidence concluded and the witness withdrew.

Mr Charles Briers, Mr Mark Curran, Ms Giselle Mawer, Ms Judi Rossi and Mr Peter Siapos, Residents Against Polluting Stacks (RAPS) were sworn and examined.

Ms Rossi tendered the following documents:

- An advertisement from the RTA for a Community Liaison and Air Quality Consultative Committee
- Email from J Stricker, RTA to V Sheppard, NSW Health dated 9 June 2002 re analysis of complaints

Resolved, on the motion of Mr Jobling, that the documents be accepted by the Committee.

Mr Curran tendered the following documents:

- 1995 article from PIARC Congress re ventilation for road tunnels
- technical report re the dust cleaning system in the Chinbu Tunnel, South Korea
- 2 technical reports in Norwegian on the Laedalstunnelen and Stomsastunnelen tunnels.
- Correspondence from the Norwegian Directorate of Public Roads to CTA regarding dust cleaning in the Ekeberg Tunnel
- Technical report on efficiency of CTA high velocity ESP cell dated 27 March 2002
- Email to Giselle Mawer from Ministry of Land Infrastructure and Transport, Japan, dated 31 August 2001.

Resolved, on the motion of Mr Jobling, that the documents be accepted by the Committee.

Ms Mawer referred to a number of documents previously tabled in the Legislative Council produced as a result of call for papers.

Ms Mawer tendered the following documents:

- Articles from the Lancet regarding the health effects of air pollution
- An article on the concentration of PM10 in stack emissions.

Resolved, on the motion of Ms Fazio, that the documents be accepted by the Committee.

Evidence concluded and the witnesses and the public withdrew.

Resolved, on the motion of Mr Jobling, that pursuant to the provisions of section 4 of the *Parliamentary Papers (Supplementary Provisions) Act 1975* and under the authority of Standing Order 252, the Committee authorises the Clerk of the Committee to publish the transcript of the hearing and any documents tabled during the hearing, except those for which confidentiality has been requested.

That in view of the short time frame for this inquiry the Committee Clerk be authorised to put the uncorrected version of the published transcript on the Committee's website, with appropriate disclaimers.

3. Adjournment

The committee adjourned at 5:01 pm until 6:30 pm on Tuesday 3 December 2002 at Parliament House.

Steven Reynolds

Clerk to the Committee

Minutes No. 88

Tuesday 3 December 2002 at 6:30 pm
Room 1153, Parliament House

1. Members Present

The Hon Richard Jones MLC (*Chair*)
The Hon John Jobling MLC
The Hon Malcolm Jones MLC
The Hon Peter Primrose MLC
The Hon John Ryan MLC
Ms Jan Burnswoods MLC
The Hon Ron Dyer MLC (Fazio)

2. Apologies

The Hon Amanda Fazio MLC

3. Substitution

The Government Whip advised the Chair that Mr Dyer would substitute for Ms Fazio.

4. Confirmation of Draft Minutes

Resolved, on the motion of Mr Jobling, that minutes 86 and 87 be confirmed.

5. Inquiry into M5 East Tunnel**Correspondence**

The Chair tabled the following correspondence:

- Letter from Ms Barbara Coorey to Committee Chair, dated 14 November 2002 regarding the decision to relocate the stack in 1997.
- Letter from Mr David Tucker, Operations and Maintenance Manager, Baulderstone Hornibrook, dated 22 November 2002 providing details of compliance with occupational health and safety requirements.
- Email from Dr Ray Kearney to staff of Committee Chair dated 19 November 2002 regarding the solubility of fine particles.
- Email from Noel Child to Committee Director dated 18 November 2002 clarifying the source of the figures quoted in his submission regarding the use of electrostatic precipitators in Japan.
- Letters from Sam Haddad, PlanningNSW, dated 25 and 27 November 2002 providing answers to questions on notice from hearings.
- Letter from Mr Paul Forward, Chief Executive, RTA, dated 3 December 2002 providing answers to questions on notice from hearings.
- Letter from Dr Greg Stewart, Chief Medical Officer, NSW Health, dated 3 December 2002 providing answers to questions on notice from hearings.

Outgoing:

- Letter from Chair to Minister for Industrial Relations, the Hon John Della Bosca MLC, dated 15 November 2002 regarding occupational health and safety requirements for the tunnel operators.
- Letters from Committee Director to Dr Greg Stewart (NSW Health); Mr Paul Forward (RTA); the Hon Nick Greiner (Baulderstone-Hornibrook); Ms Susan Holliday (PlanningNSW) and Mr Joe Woodward (EPA), all dated 22 November 2002, enclosing questions on notice following inquiry hearings.

- Letter from Chair to Mr David Tucker, Operations and Maintenance Manager, Baulderstone Hornibrook, dated 19 November 2002 seeking details of compliance with occupational health and safety requirements.

Resolved, on the motion of Mr Jobling, that the correspondence be accepted.

Submissions

Resolved, on the motion of Mr Jobling, that additional submissions received since 15 November 2002 be accepted by the Committee.

That Pursuant to the provisions of section 4 of *the Parliamentary Papers (Supplementary Provisions) Act 1975* and under the authority of Standing Order 252, the Committee authorises the Clerk of the Committee to publish the additional submissions received since 15 November 2002.

Chair's Draft Report

The Chair tabled his draft report which, having been circulated, was taken as being read.

Chapter One read.

Resolved, on the motion of Mr Ryan, that Chapter One be adopted.

Chapter Two read.

The Committee deliberated.

Ms Burnswoods moved, that:

The words "and air pollution" be inserted after "congestion" in paragraph 2.5.

The Committee deliberated.

Question put.

Ayes: Mr Dyer, Ms Burnswoods, Mr Primrose

Noes: Mr Jobling, Mr Ryan, Mr M Jones, Mr R Jones

Question resolved in the negative.

Ms Burnswoods moved that the following paragraph be inserted prior to paragraph 2.6, with the heading "Concurrent Changes":

The Committee received evidence from Dr Peter Best from Katestone Environmental that a potential causal factor that needed to be taken into account was the changes to fuel specification that occurred at the same time as the M5 East Tunnel was opened. A new petrol additive for lead replacement petrol called MMT which is magnesium based was introduced in January 2002. The impact of this change is not known. However, additional evidence was given to the Inquiry on 18 November that some symptoms reported by people concerned about MMT are consistent with the respiratory effects reported by residents living near the M5 ventilation stack. There is no assessment data or measurements of the impact of MMT in Australian fuel. This matter is discussed further in Chapter Five.

The Committee deliberated.

Question put.

Ayes: Mr Dyer, Ms Burnswoods, Mr Primrose

Noes: Mr Jobling, Mr Ryan, Mr M Jones, Mr R Jones

Question resolved in the negative.

Resolved, on the motion of Mr Ryan, that Chapter Two be amended.

Chapter Three read.

Resolved, on the motion of Ms Burnswoods, that:

The words in paragraph 3.25 “the Committee expresses concern about the effectiveness of these measures on regional air quality and the way they have been reported by the RTA and PlanningNSW” be deleted and replaced with “ considers this matter further”.

Mr Ryan moved that Recommendation 1 be adopted.

Question put.

Ayes: Mr Jobling, Mr Ryan, Mr M Jones, Mr R Jones

Noes: Mr Dyer, Ms Burnswoods, Mr Primrose

Question resolved in the affirmative.

Resolved, on the motion of Mr Ryan, that Chapter Three as amended be adopted.

Chapter Four read.

Resolved, on the motion of Mr Dyer, that:

The word “misleading” in paragraph 4.11 be replaced with “less than complete”.

Mr Ryan moved that Recommendation 2 be adopted.

Question put.

Ayes: Mr Jobling, Mr Ryan, Mr M Jones, Mr R Jones

Noes: Mr Dyer, Ms Burnswoods, Mr Primrose

Question resolved in the affirmative.

Ms Burnswoods moved, that:

The quote in paragraph 4.33 be deleted after the first answer from Ms Holliday.

The Committee deliberated.

Question put.

Ayes: Ms Burnswoods, Mr Dyer, Mr Primrose

Noes: Mr Ryan, Mr Jobling, Mr M Jones, Mr R Jones

Question resolved in the negative.

Resolved, on the motion of Mr Ryan, that:

His question in paragraph 4.35 be deleted from the quote, and the answer to question 10 on notice received from the RTA be added to the paragraph, with the amendment circulated to members for approval.

Resolved, on the motion of Ms Burnswoods, that:

All bolding used for emphasis be removed from the text of the report, excepting for headings.

Resolved, on the motion of Mr Ryan, that:

This question be removed from the quote on paragraph 4.47, and replaced with the following words:

The question of whether data could be interpreted as indicative of a significant decrease in NO_x in the area immediately around the stack.

Resolved, on the motion of Mr M Jones, that:

His question and the answer from Dr Holmes regarding the 6 to 8 roses being upwind of the stack be added to after paragraph 4.46, with the amendment circulated to members for approval.

Resolved, on the motion of Mr Ryan, that:

The text before the quote in paragraph 4.75 be deleted and replaced with the text of paragraph 4.76.

Resolved, on the motion of Mr Ryan, that:

The question from Mr Jobling at the start of paragraph 4.76 be deleted and replaced with the following introduction to the quote:

The EPA responded to the question of whether they should have a role in compliance auditing of monitoring data:

Resolved, on the motion of Ms Burnswoods, that:

The last sentence of 4.78 and the ensuing quote be deleted but that the evidence be referred to in a footnote.

Mr Jobling moved that Recommendation 3 be adopted.

Question put.

Ayes: Mr Jobling, Mr Ryan, Mr M Jones, Mr R Jones

Noes: Mr Dyer, Ms Burnswoods, Mr Primrose

Question resolved in the affirmative.

Resolved, on the motion of Mr Ryan, that:

With the exception of the two amendments to be circulated, Chapter Four as amended be adopted.

Chapter Five read.

Mr Dyer moved that:

The word "Fears and" be deleted from the subheading after paragraph 5.2.

Question put.

Ayes: Ms Burnswoods, Mr Dyer, Mr Primrose

Noes: Mr Ryan, Mr Jobling, Mr M Jones, Mr R Jones

Question resolved in the negative.

Mr Jobling moved that Recommendation 4 be adopted.

Question put.

Ayes: Mr Jobling, Mr Ryan, Mr M Jones, Mr R Jones

Noes: Mr Dyer, Ms Burnswoods, Mr Primrose

Question resolved in the affirmative.

Resolved, on the motion of Ms Burnswoods, that:

The following paragraph be added after paragraph 5.39:

The impacts of the changes to Australian Fuel Standards by the introduction of MMT as a fuel additive for lead replacement petrol have not been investigated. This change was intruded concurrently with the opening of the M5 East tunnel and the reported health impacts of MMT are similar to those reported by local residents. Due to a lack of evidence, it is not possible to determine if MMT has contributed to the health impacts being reported as attributable only to the opening of the tunnel. Given the high levels of concern expressed in North America about the toxicity of MMT it is recommended that the Federal Government be requested to conduct an inquiry into the safety and use of MMT.

Resolved, on the motion of Ms Burnswoods, that:

As a source a footnote refer to the questions by Ms Fazio to Dr Best.

Resolved, on the motion of Ms Burnswoods, that:

The following recommendation be added after the new paragraph:

The Committee recommends that the Federal Government undertake an inquiry into the safety and use of MMT as a fuel additive.

Ms Burnswoods moved, that:

The quote from Mr Jobling be removed from paragraph 5.79.

Question put.

Ayes: Ms Burnswoods, Mr Dyer, Mr Primrose

Noes: Mr Jobling, Mr Ryan, Mr M Jones, Mr R Jones

Question resolved in the negative.

Mr Jobling moved, that Recommendations 5 and 6 (now 6 and 7) be adopted.

Question put.

Ayes: Mr Jobling, Mr Ryan, Mr M Jones, Mr R Jones

Noes: Mr Dyer, Ms Burnswoods, Mr Primrose

Question resolved in the affirmative.

Ms Burnswoods moved, that:

Recommendation 7 (now 8) be deleted and replaced with the following:

The Committee notes that the WorkCover Authority currently has the power under its legislation to undertake audit reviews if it has concerns that the RTA or the tunnel operators are not complying with requirements.

Question put.

Ayes: Ms Burnswoods, Mr Dyer, Mr Primrose

Noes: Mr Ryan, Mr Jobling, Mr M Jones, Mr R Jones

Question resolved in the negative.

Mr Jobling moved that Recommendation 8 (now 9) be adopted.

Question put.

Ayes: Mr Jobling, Mr Ryan, Mr M Jones, Mr R Jones

Noes: Mr Dyer, Ms Burnswoods, Mr Primrose

Question resolved in the affirmative.

Resolved, on the motion of Mr Jobling, that Chapter Five as amended be adopted.

Chapter Six read.

Resolved, on the motion of Mr Dyer, that:

The second paragraph of the quote from the Minister for Roads be deleted from paragraph 6.15.

Resolved, on the motion of Mr Dyer, that:

The words "while unpaid" be deleted and replaced with "are volunteers who".

The Committee agreed to meet at the next available opportunity to complete consideration of the report.

6. Adjournment

The Committee adjourned at 8:00 pm until Wednesday 4 December 2002 at 1:20 pm.

Steven Reynolds

Clerk to the Committee

Minutes No. 89

Wednesday 4 December 2002 at 1:40 pm
Room 1136, Parliament House

1. Members Present

The Hon Richard Jones MLC (*Chair*)
The Hon Amanda Fazio MLC
The Hon Malcolm Jones MLC
The Hon Peter Primrose MLC
The Hon John Ryan MLC
Ms Jan Burnswoods MLC

2. Apologies

The Hon John Jobling MLC

3. Confirmation of Draft Minutes

The Committee Director tabled an amended draft of the minutes circulated the previous evening.

Resolved, on the motion of Ms Burnswoods that minutes 88 be confirmed.

4. Inquiry into M5 East Tunnel**Correspondence**

The Chair tabled the following correspondence:

- Letter from Mr Nick Greiner, Chairman, Baulderstone Hornibrook, dated 3 December 2002 providing answers to questions on notice from hearings.
- Letter from Mr Joe Woodward, Acting Director General, EPA dated 3 December 2002 providing answers to questions on notice from hearings.

Resolved, on the motion of Ms Burnswoods, that the correspondence be accepted.

Chair's Draft Report

The Chair tabled proposed amendments to paragraph 4.35 and 4.48, which had previously been circulated. The Committee agreed that the changes reflected their discussion at the deliberative on 3 December 2002.

The Chair tabled two quotes from evidence regarding MMT for addition to the paragraph after 5.39 regarding MMT.

Resolved, on the motion of Ms Fazio, that:

The quote from the evidence Dr Holmes be added to the paragraph regarding MMT, and the paragraph be preceded by a sub-heading.

The Committee resumed consideration of Chapter Six of the Chair's draft.

John Ryan moved that recommendation 9 (now 10) be adopted.

Question put.

Ayes: Mr Ryan, Mr M Jones, Mr R Jones

Noes: Ms Burnswoods, Ms Fazio, Mr Primrose

Their being an equality of votes, the Chair cast his vote with the ayes.

Question resolved in the affirmative.

Resolved, on the motion of Mr Ryan, that Chapter Six as amended be adopted.

Chapter Seven read.

The Chair tabled the selected quote from the evidence of Dr Manins which had been circulated, and the extract from the quote suggested by Mr Primrose.

Resolved, on the motion of Mr Ryan, that:

The question from Mr Primrose and the answer provided by Dr Manins be inserted after paragraph 7.6.

Mr M Jones moved that recommendation 10 (now 11) be amended by deleting “implemented” and replacing with “enforce”

Question put.

Ayes: Mr Ryan, Mr M Jones, Mr R Jones

Noes: Ms Burnswoods, Ms Fazio, Mr Primrose

Their being an equality of votes, the Chair cast his vote with the ayes.

Question resolved in the affirmative.

Resolved, on the motion of Ms Fazio, that:

The last sentence of paragraph 7.17 be deleted.

John Ryan moved that recommendation 11 (now 12) be adopted.

Question put.

Ayes: Mr Ryan, Mr M Jones, Mr R Jones

Noes: Ms Burnswoods, Ms Fazio, Mr Primrose

Their being an equality of votes, the Chair cast his vote with the ayes.

Question resolved in the affirmative.

Resolved, on the motion of Mr Ryan, that Chapter Seven as amended be adopted.

Resolved, on the motion of Mr Ryan, that the report, as amended, be adopted.

Resolved, on the motion of Mr Ryan, that:

The report be signed by the Chair and presented to the House on Thursday 5 December in accordance with the resolution establishing the committee of 13 May 1999.

Resolved, on the motion of Mr Ryan, that:

Committee staff be authorised to make any grammatical or typographical changes to the report prior to tabling.

Resolved, on the motion of Mr Ryan, that:

Pursuant to the provisions of section 4 of the Parliamentary Papers (Supplementary Provisions) Act 1975 and under the authority of Standing Order 252, the Committee authorises the Clerk of the Committee to publish the report, correspondence, submissions and tabled documents, except those for which confidentiality has been requested.

The Government members indicated that they would submit a dissenting report. The Committee Chair indicated this should be lodged electronically with the secretariat by 9:00 am on Thursday 5 December 2002.

5. Adjournment

The meeting adjourned at 2:10 pm sine die.

Steven Reynolds

Clerk to the Committee

Appendix 6

Dissenting Statement

Dissenting statement

**Legislative Council
General Purpose Standing Committee No. 5
M5 East Tunnel (2002)**

Dissenting Report

**Hon. Peter Primrose MLC
Hon. Jan Burnswoods MLC
Hon. Amanda Fazio MLC**

The findings and recommendations of the Inquiry are not supported as it is considered that the conduct and deliberations of the Committee have been flawed.

This has been the Committee's third Inquiry into the M5 East, and no new evidence of any substance has been presented. Therefore, Government Members of the Committee have chosen to provide a dissenting view.

Conduct of the Committee

At the commencement of the Inquiry an attempt was made by Opposition members to restrict the Inquiry to one day, with no open hearings.

The Hon John Jobling conceded this at the hearing held on 18 November 2002:

“my suggestion was that the bureaucracy who were responsible, from the RTA, the EPA, from Health, that the specific officer that had specific details be invited to come before us, so they could be questioned in minute detail or at length about failures to do things, failures to correct things or what was going on between them.”

Only after vigorous protests by Government members was it determined that the usual Inquiry procedures would be followed i.e. that advertisements would be placed in newspapers inviting submissions; that two days of public hearings would be held; and that a site visit to the ventilation stack would take place.

Report of the Committee

The report, in the main, revisits findings of previous inquiries and the recommendations of this Inquiry appear to be based on presumptions formed in advance of and in isolation from much of the evidence placed before the Committee.

The hearings for this Inquiry were marked by a tendency for Opposition members to make statements, based on these presumptions, rather than ask questions of witnesses.

Large sections of the report focus on issues such as electrostatic precipitators, which were canvassed in detail in earlier inquiries, but about which little new evidence was received.

Unequivocal evidence was received from a number of expert witnesses that there was no demonstration to date that there has been an increase in outside particulate matter because of the tunnel. Yet little notice was taken of this when the report was drafted and finalised.

The actions of NSW Health in initiating a study into odour impacts on residents near the ventilation stack are a positive response to local concerns. Yet, many of the recommendations of the Committee pre-empt the results of the current investigation by NSW Health.

Recommendations of the Committee

The following comments are made with respect to each of the recommendations made by majority resolution of the Committee:

Recommendation 1

There has been no evidence of substance presented to this Inquiry beyond that given to previous inquiries to demonstrate the need for this implementation.

Recommendation 2

The current protocol is in accord with supplementary approval condition 73/5 and addresses localised monitoring. This recommendation pre-empted the current investigation being conducted by NSW Health, which is based upon the complaints data provided by the RTA.

It would be more appropriate for any recommendations to be based upon the outcomes of Health's study, rather than precede them.

Recommendation 3

Ambient air quality data does not indicate any discernible impact on surrounding areas as a result of stack emissions. The Environmental Protection Authority has sufficient capacity to enforce potential environmental breaches. Given the extensive conditions with which the RTA must comply, additional scrutiny is not considered to be necessary.

Recommendation 4

The development of a PM₁ standard should follow the development of a PM_{2.5} standard about which a draft was released for comment in October 2002. Hence, this recommendation is premature.

Recommendation 5

The Government members are delighted that after some persuasion the Committee majority agreed to call on the Federal Government to undertake this important inquiry.

Recommendation 6

As the evidence placed before the Committee has established, the M5 East is conforming with project goals and health impacts have not been identified.

The current study by NSW Health is considering the effects of windows up/down and its output will provide a basis for further consideration.

The recommendation pre-empts the outcome of the current study and may provide unnecessary or incorrect advice to motorists if implemented at this stage, which may lead motorists to become unnecessarily concerned about using the tunnel.

Recommendation 7

Recommendations should await the NEPC guidelines for PM_{2.5} goals. The current Health NSW study will provide PM_{2.5} data in peak hours when emissions are highest. There is no purpose in monitoring PM_{2.5} in tunnels if there are no standards to monitor against.

Recommendation 8

Monitoring for PM_{2.5} is in the Cross City tunnel conditions. This data will assist in setting standards that do not yet exist. Hence, only data reporting is appropriate at this stage.

Recommendation 9

OH&S systems are already in place for the tunnel, as explained in BHBB's letter to the Inquiry dated 22 November 2002.

Under existing legislation, the WorkCover Authority has the power to investigate worksites anywhere within New South Wales that it considers appropriate. WorkCover has the power to investigate the M5 East tunnel if it satisfies itself that such an investigation is necessary and appropriate, and government agencies would of course cooperate with any such investigation.

Recommendation 10

The need for filtration has not been established and the technology required is still unproven. In-tunnel carbon monoxide and visibility data conform with project goals.

See also Part 3.5 the RTA submission dated 11 November 2002.

Recommendation 11

The Government already has in place a voluntary program of testing and a smoky vehicle detection program. The RTA is also providing training for local councils in the vicinity of the M5 East, to assist Councils in contributing to enforcement with respect to smoky vehicles in their areas.

Recommendation 12

The Property Value Guarantee is the result of NSW Government policy decisions to assist local residents in maintaining the value of their homes. It is reasonable and appropriate in regard to its area of coverage and its terms of guarantee.