ENVIRONMENT REPORT

AIR MONITORING REPORT 2006 – COMPLIANCE WITH THE NATIONAL ENVIRONMENT PROTECTION (AMBIENT AIR QUALITY) MEASURE

Publication 1137 June 2007

OVERVIEW

This report presents the results of air quality monitoring in Victoria and assesses this against the requirements of the *Ambient Air Quality National Environment Protection Measure*[1] (AAQ NEPM). In addition, EPA also produces an annual air quality report for a more general audience.[2]

The major impact on Victoria's air quality in 2006 came from the bushfires experienced in January and December (see Figure 1). These fires led to an atypically high number of days when the particle standards were not met and an increase in the number of exceedences of the ozone standards.

Windblown dust and accumulation of combustion particles in calm, highly stable air also resulted in some additional days when the particle standards were not met. At other times, Victoria's air was generally clean.

Figure 1: Melbourne's central business district affected by bushfire smoke

Photo: Paul Rovere courtesy of *The Age*

The AAQ NEPM establishes:

- requirements for monitoring air quality
- air quality standards, which are levels of specified pollutants against which air quality can be assessed
- a goal that the air quality standards are met by 2008 to the extent specified in the NEPM. Recognising that certain events can impact on air quality, the NEPM specifies a maximum number of days on which it is permissible to exceed the standard.

EPA performed monitoring in accordance with Victoria's monitoring plan,[3] AAQ NEPM technical papers and EPA's NATA accreditation.

The AAQ NEPM goal was met for carbon monoxide (CO), nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) at all monitoring stations where there was sufficient data capture to demonstrate compliance.

Due to the bushfires, most monitoring stations did not meet the goals for particles (as PM_{10}) or ozone (O_3).

PM_{10} exceeded the 2008 goal at all stations monitoring throughout the bushfire period.

The one-hour and four-hour standards for O_3 were exceeded at all stations that operated for the full year. All exceedences were on days when there was particle pollution from bushfires. The 2008 goal was met at only five stations for the one-hour standard and two stations for the four-hour standard.

The 24-hour advisory reporting standard for particles (as $PM_{2.5}$) was exceeded at the two stations monitoring in the Port Phillip region. The annual reporting standard for $PM_{2.5}$ was exceeded at Alphington.

Throughout 2006, EPA continued a program of station upgrades. Selected stations were taken off-line for periods of two to four weeks to enable the upgrades, resulting in unavoidable data losses. Seven stations were upgraded, which generally prevented achieving the data capture rates required to demonstrate compliance with the AAQ NEPM goal at these stations. In addition, the central business district monitoring

[1] *National Environment Protection Measure for Ambient Air Quality*, National Environment Protection Council publication, available from www.ephc.gov.au.
[2] *Victoria's Air Quality – 2006* (forthcoming EPA publication), available from www.epa.vic.gov.au/publications/
[3] *Ambient Air Quality NEPM Monitoring Plan Victoria,* (EPA publication 763), available from www.epa.vic.gov.au/publications/

station at RMIT was closed due to resumption of the site by the landlord.

The data capture targets were achieved at all stations that operated for the full year. Where stations operated for less than the full 12 months, data capture for the period they did operate was consistent with the targets. While reduced data capture limited the number of stations at which compliance could be demonstrated for each pollutant, information available from such reduced monitoring periods was generally consistent with that reported above.

A. MONITORING SUMMARY

Current performance monitoring stations

Victoria's AAQ NEPM air monitoring plan was approved by the National Environment Protection Council (NEPC) Ministers in February 2001. Data presented in this report have been produced in accordance with the monitoring plan, except where noted.

The AAQ NEPM requires the monitoring of the pollutants carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), lead (Pb), particles less than 10 micrometres in diameter (PM_{10}) and particles less than 2.5 micrometres in diameter ($PM_{2.5}$).

Eight regions are defined in the monitoring plan. Port Phillip and Latrobe Valley regions have permanent performance monitoring stations (shown in Figures 2 and 3), consistent with the monitoring plan. The six rural regions – Ballarat, Bendigo, Shepparton, Wodonga, Warrnambool and Mildura – are being monitored sequentially for a year each, using a mobile monitoring station to determine future monitoring requirements.

The performance monitoring stations, pollutants monitored and site types are summarised in Table 1. Site types are defined as: generally representative upper bound for community exposure sites; population-average sites; and peak sites (for definitions, see the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 3, *Monitoring Strategy*, available from www.ephc.gov.au).

Table 1: Victorian performance monitoring stations

Region Performance monitoring station	**Location category**	**Site type**				
		CO	**NO_2**	**O_3**	**SO_2**	**PM_{10}**
Port Phillip						
Alphington	Res/LI	G*	G*	Pop	Pop*	G*
Altona North	I/Res				G	
Brighton	Res		G	Pop*		Pop
Dandenong	LI			Pop		Pop
Footscray	I/Res		G*	G*		G*
Geelong South	LI/Res	G*	G*	Pop*	G*	G*
Melton	Res			G		
Mooroolbark	Res			Pop		Pop
Point Cook	Rur/Res		Pop*	G*		
Point Henry	I/Rur			Pop		
Richmond	Res	G				G
RMIT (CBD)	CBD	G*	G*		G	G*
Latrobe Valley						
Moe	Res		Pop	G	G	G
Traralgon	Res		G*	G*	G*	G*

RMIT (CBD): RMIT University (Central business district)
LI: Light industrial
Rur: Rural
Pop: Population-average
I: Industrial
Res: Residential
G: Generally representative upper bound
*: Trend station

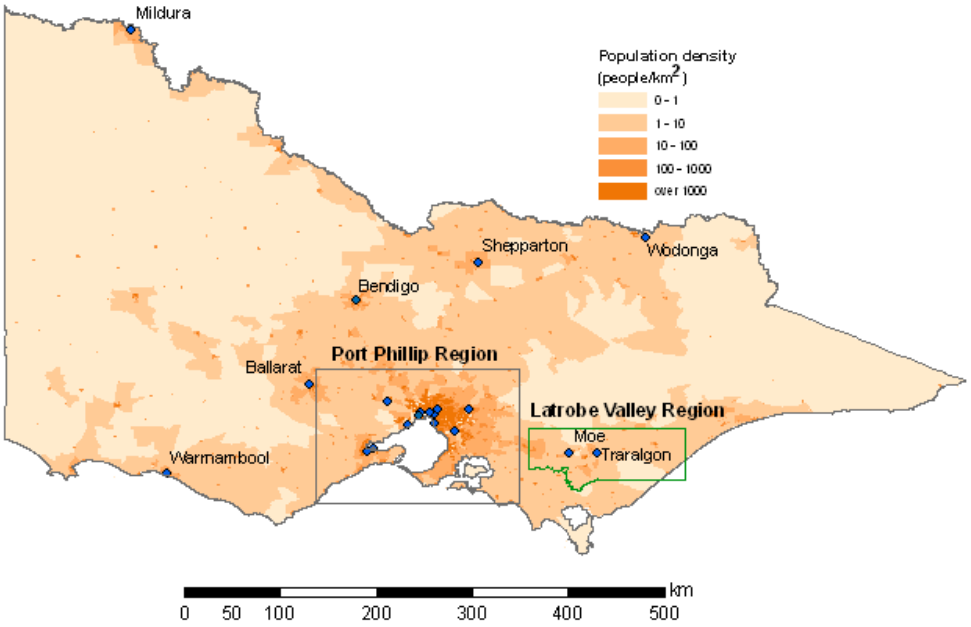

Figure 2: AAQ NEPM regions in Victoria

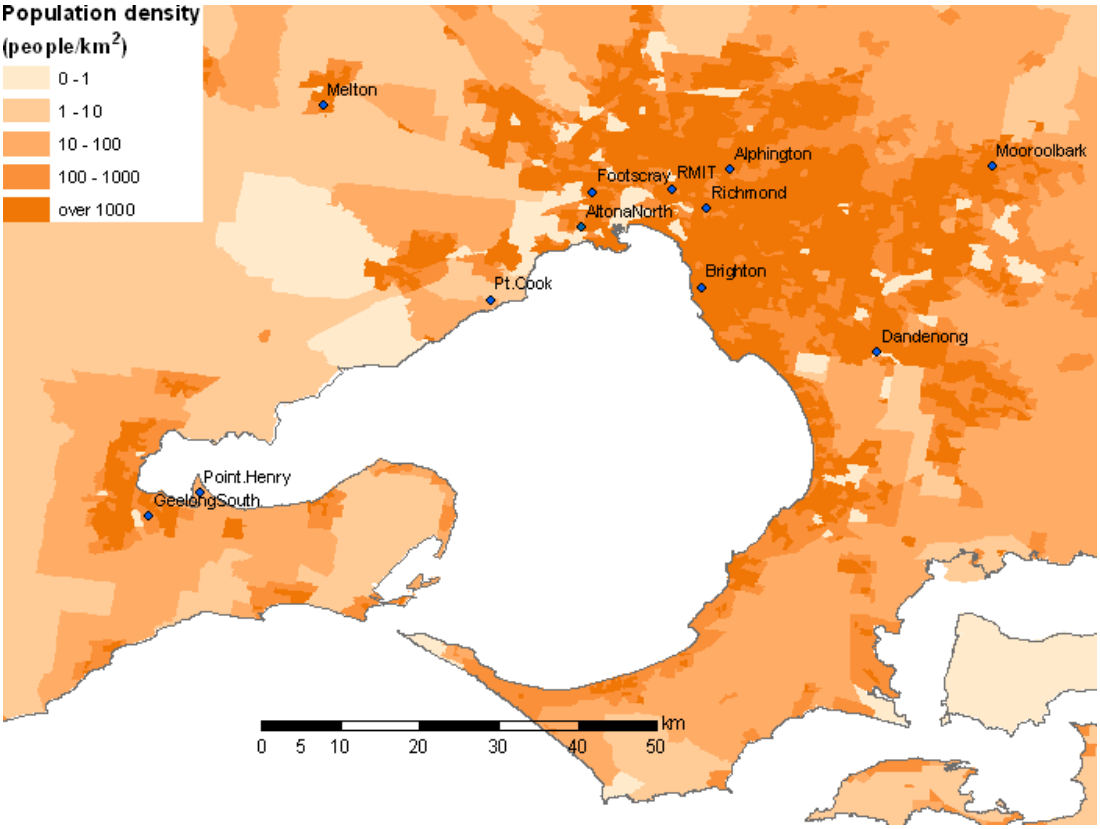

Figure 3: Monitoring stations in Port Phillip region

Description of exposed population

The exposed population represented by each monitoring station is described qualitatively by the location category column in Table 1 and Table 2. Further information is given in Appendix C of the monitoring plan.

Implementation of the monitoring plan

In addition to the performance monitoring stations specified in the monitoring plan, a 12-month mobile monitoring campaign commenced at Warrnambool for the first time in October 2006.

Monitoring ceased at the CBD station at RMIT University in September, when the lease was terminated due to building extensions. An alternative CBD site is being considered.

The Southwest Metro station at Paisley was renamed Altona North in June 2006 to better reflect its geographic location.

The peak station for lead, at Collingwood, was closed in December 2004 because levels were so low. This change to Victoria's monitoring plan was approved in accordance with NEPM procedures.[4]

Campaign monitoring continued at:

- Mooroooduc, where ozone was monitored until May 2006
- Mildura, where PM_{10} was monitored until June 2006
- Ballarat, until July 2006 (see Figure 4)
- Warrnambool, commencing for 12 months in October 2006.

Figure 4: Campaign station at Ballarat

Each of these campaign stations meets the recommendations of the Australian standard for siting of sampling units (as shown in Table 2), and 2006 data are included in this report. Alphington, Richmond and Moe continue to have minor non-compliances due to the proximity of trees. However, this does not materially affect the air quality data from these sites.

A major program of upgrading the monitoring stations continued during 2006 (see Figure 5). Stations were taken off-line sequentially for periods of about two to four weeks, resulting in unavoidable data losses. Stations affected were: Altona North (in January–February), Moe (March), Alphington (April), Brighton (August), Geelong South (September), Footscray (October) and Point Cook (November–December).

Figure 5: Upgraded monitoring station at Geelong South

Monitoring methods

Victorian monitoring is conducted in accordance with the standards shown in Table 3. Data not meeting the requirements of these standards and EPA's quality assurance procedures are identified as invalid and not included in reporting.

TEOM PM_{10} data included in this report have been adjusted according to the approved procedure,[5] using the temperature-dependent formula with a constant value of K equal to 0.04. The resulting adjustments vary from no change at daily average temperatures at or above 15 °C to an increase of 40 per cent at a temperature of 5 °C.

[4] National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 9, *Lead Monitoring*, available from www.ephc.gov.au.

[5] National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 10, *Collection and Reporting of TEOM PM_{10} Data*, available from www.ephc.gov.au.

Table 2: Summary of stations' siting compliance with AS 2922–1987

Region Station	Location category	Height above ground	Minimum distance to support structure	Clear sky angle of 120°	Unrestricted airflow of 270°/360°	20m from trees	No boiler or incinerators nearby	Minimum distance from road or traffic
Port Phillip								
Alphington	Res/LI	☑	☑	☑	☑	☒	☑	☑
Altona North	I/Res	☑	☑	☑	☑	☑	☑	☑
Brighton	Res	☑	☑	☑	☑	☑	☑	☑
Dandenong	LI	☑	☑	☑	☑	☑	☑	☑
Footscray	I/Res	☑	☑	☑	☑	☑	☑	☑
Geelong South	LI/Res	☑	☑	☑	☑	☑	☑	☑
Melton	Res	☑	☑	☑	☑	☑	☑	☑
Moorooduc	Rur	☑	☑	☑	☑	☑	☑	☑
Mooroolbark	Res	☑	☑	☑	☑	☑	☑	☑
Point Cook	Rur/Res	☑	☑	☑	☑	☑	☑	☑
Point Henry	I/Rur	☑	☑	☑	☑	☑	☑	☑
Richmond	Res	☑	☑	☑	☑	☒	☑	☑
RMIT (CBD)	CBD	☒	☑	☑	☑	☑	☑	☑
Latrobe Valley								
Moe	Res	☑	☑	☑	☑	☒	☑	☑
Traralgon	Res	☑	☑	☑	☑	☑	☑	☑
Ballarat	Res	☑	☑	☑	☑	☑	☑	☑
Mildura	Res	☑	☑	☑	☑	☑	☑	☑
Warrnambool	Res	☑	☑	☑	☑	☑	☑	☑

CBD: Central business district I: Industrial LI: Light industrial Res: Residential Rur: Rural

Table 3: Methods for monitoring the NEPM pollutants

Pollutant		Standard	Title	Method Used
Carbon monoxide	CO	AS3580.7.1-1992	*Ambient Air – Determination of Carbon Monoxide – Direct Reading Instrument Method*	Gas filter correlation/ Infrared.
Nitrogen dioxide	NO_2	AS3580.5.1-1993	*Ambient Air – Determination of Oxides of Nitrogen – Chemiluminescence Method*	Gas phase chemiluminescence.
Photochemical oxidant (ozone)	O_3	AS3580.6.1-1990	*Ambient Air – Determination of Ozone – Direct Reading Instrument Method*	Non-dispersive ultraviolet.
Sulfur dioxide	SO_2	AS3580.4.1-1990	*Ambient Air – Determination of Sulfur Dioxide – Direct Reading Instrument Method*	Pulsed fluorescence
Particles	PM_{10}	AS3580.9.8-2001	*Determination of Suspended Particulate Matter – PM_{10} Continuous Direct Mass Method using a Tapered Element Oscillating Microbalance Analyser*	Tapered element oscillating microbalance (TEOM).
	$PM_{2.5}$	US CFR 40 Part 50 Appendix L[a]	*Reference Method for the Determination of Fine Particulate matter as $PM_{2.5}$ in the Atmosphere*	Gravimetric reference method
	$PM_{2.5}$	AS3580.9.8-2001[a]	*Technical Paper on Monitoring for Particles as $PM_{2.5}$*	TEOM

a: Modified for use in the $PM_{2.5}$ Equivalence Program according to the NEPM Technical Paper

NATA status

All performance monitoring stations and AAQ NEPM campaign monitoring operated by EPA are covered by its NATA accreditation (Number 1576). EPA was successfully reaccredited in 2006.

Monitoring in the Latrobe Valley region was performed for EPA by Connell Wagner PPI under its NATA accreditation (Number 4669).

Screening

For regions other than Port Phillip and Latrobe Valley, the monitoring plan outlines a process to demonstrate whether levels of CO, NO_2, O_3 and PM_{10} are consistently below the standards. Monitoring is not required if specified screening procedures are satisfied. Screening procedures as indicated in Table 4 have been satisfied for CO, NO_2 and O_3.

Table 4: Screening procedures satisfied

Region	CO	NO_2	O_3	PM_{10}
Ballarat	A	A	-	-
Bendigo	A	A	E&F	-
Mildura	F	F	E&F	-
Shepparton	F	F	E&F	-
Warrnambool	F	F	E	-
Wodonga	F	F	E&F	-

In addition to details given in previous annual reports, monitoring at Ballarat in 2005–06 indicated:

- a maximum eight-hour average CO of 3.1 ppm. This satisfies Procedure A and confirms the earlier screening of Ballarat by Procedure F
- a maximum one-hour NO_2 reading of 0.047 ppm and an annual average of 0.005 ppm. These are sufficiently low to satisfy Procedure A for Ballarat and to confirm screening of other regions by Procedure F
- maximum one-hour and four-hour O_3 averages of 0.65 ppm and 0.61 ppm. These satisfy screening criteria for the smaller regions, using generic modelling as provided for in the screening technical paper, revised to include results of CSIRO calculations.[6] Note that Warrnambool satisfies screening for ozone by generic modelling without reference to Ballarat as a larger compliant region.
- a maximum 24-hour average PM_{10} of 43.8 $\mu g/m^3$. This is not low enough to satisfy screening criteria for Ballarat or the other regions of lower population.

Regional campaign monitoring continues to record elevated concentrations of PM_{10} that do not meet screening criteria. The mobile monitoring station was moved from Ballarat to Warrnambool during 2006. Future monitoring of PM_{10} will be considered in a forthcoming review of the monitoring plan.

$PM_{2.5}$ monitoring

In 2003 the NEPM was varied to include advisory reporting standards for $PM_{2.5}$. Victoria monitors $PM_{2.5}$ by the reference method specified in the NEPM (on a one-day-in-three basis) at two stations (Alphington and Footscray). Procedures for sampling and weighing filters were upgraded in 2006, to ensure substantial compliance with the recommended operating procedures.[7]

Victoria also participates in the $PM_{2.5}$ Equivalence Program, with TEOM monitors located at Alphington and Footscray – but not Mooroolbark, as proposed in the NEPM. TEOM $PM_{2.5}$ readings are taken with the inbuilt adjustment for PM_{10} removed (A and B constants set to 0 and 1) and no adjustment for loss of volatiles.

B. ASSESSMENT OF COMPLIANCE WITH STANDARDS AND GOAL

Air quality is assessed against the AAQ NEPM standards and goal as shown in Table 5.

- **Standards** are concentrations, in parts per million (ppm) or micrograms per cubic metre ($\mu g/m^3$), against which air quality can be assessed.
- The **goal** of the AAQ NEPM is to achieve the National Environment Protection standards as assessed in accordance with the monitoring protocol within ten years from commencement (that is, by 2008) to the extent specified in Schedule 2 of the AAQ NEPM. The extent is expressed as a maximum allowable number of exceedences for each standard (shown in column four of Table 5). The goal guides the formulation of strategies for the management of human activities that may affect the environment.

The number of allowable exceedences associated with the standards has been set to account for unusual meteorological conditions and, in the case of particles, natural events such as bushfires and dust storms that cannot be controlled through normal air quality management strategies.

[6] National Environment Protection (Ambient Air Quality) Measure Draft Technical Paper No. 4, *Screening Procedures* (2007).
CSIRO report for Peer Review Committee, *A screening procedure for monitoring ozone and nitrogen dioxide in 'small to medium-sized' cities: Phase II – Application of the procedure (2002)*.
Both available from www.ephc.gov.au.

[7] *National Environment Protection (Ambient Air Quality) Measure Technical Paper on Monitoring for $PM_{2.5}$*, available from www.ephc.gov.au.

Air quality monitoring data from each monitoring site are assessed against these standards and the associated goal.

The AAQ NEPM also specifies advisory reporting standards for $PM_{2.5}$, with a daily (25 μg/m^3) and annual (8 μg/m^3) standard. The goal for $PM_{2.5}$ is to collect sufficient data to facilitate a review of the $PM_{2.5}$ standards (this review commenced in 2005).

Table 5: AAQ NEPM air quality standards and goal

Pollutant	Averaging period	Standard	2008 goal maximum allowable exceedences
Carbon monoxide	8 hours	9.0 ppm	1 day a year
Nitrogen dioxide	1 hour 1 year	0.12 ppm 0.03 ppm	1 day a year None
Ozone	1 hour 4 hours	0.10 ppm 0.08 ppm	1 day a year 1 day a year
Sulfur dioxide	1 hour 1 day 1 year	0.20 ppm 0.08 ppm 0.02 ppm	1 day a year 1 day a year none
Particles as PM_{10}	1 day	50 μg/m^3	5 days a year
Lead	1 year	0.50 μg/m^3	none
Particles as $PM_{2.5}$	1 day 1 year	25 μg/m3 8 μg/m3	Not applicable Not applicable

The following tables summarise compliance with the standards and goal of the AAQ NEPM. Performance is assessed as complying with the NEPM if the number of exceedences of the standard is no more than the number specified in Schedule 2 of the AAQ NEPM and data availability was at least 75 per cent in each quarter of the year. Regions also meet the standards and goal if they do not require monitoring on the basis that screening shows pollutant levels are reasonably expected to be consistently below the relevant standards.

Performance is assessed as 'not demonstrated' if there have been insufficient data collected to demonstrate that the standards and goal have been met or not met. This occurred at some stations that were closed for upgrading as part of the major network upgrade program. In addition, as EPA's campaign sites operate for a 12-month period spanning two calendar years, it is not possible to assess compliance in any one calendar year. A compliance assessment, however, has been made over the life of the campaign. Regions may also be assessed as 'not demonstrated' if screening has not been completed.

Carbon monoxide

Table 6: 2006 compliance summary for carbon monoxide in Victoria

AAQ NEPM standard: 9.0 ppm (8-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region Performance monitoring station	**Data availability rates (% of hours)** Q1	Q2	Q3	Q4	Annual	**Number of exceedences (days)**	**Performance against the standard and goal**
Port Phillip							
Alphington[a]	94.2	64.5	93.6	92.8	86.3	0	ND
Geelong South	94.0	90.2	81.4	94.4	90.0	0	met
Richmond	93.8	88.9	93.7	91.3	91.9	0	met
RMIT (CBD)[b]	91.7	95.0	95.1	16.0	74.3	0	ND
Ballarat[c]	85.8	91.8	41.2	0.0	54.4	0	ND

ND: Not demonstrated by monitoring. See comments below.

a: Reduced data capture due to station upgrade.

b: Monitoring ceased at RMIT in October.

c: Campaign monitoring ceased at Ballarat in August.

Regions which do not require monitoring on the basis that screening shows pollutant levels are reasonably expected to be consistently below the relevant AAQ NEPM standard: Latrobe Valley, Ballarat, Bendigo, Shepparton, Warrnambool, Wodonga, Mildura.

During 2005, the carbon monoxide standard was not exceeded at any station and compliance was demonstrated at all stations with adequate data capture. This was not the case at Alphington, which was taken off-line for upgrading; RMIT, where the site lease was terminated; and Ballarat, which was a campaign station that did not operate for the full year. Monitoring at Ballarat demonstrated compliance with the standard for the 12 months from August 2005 to August 2006.

Nitrogen dioxide

Table 7: 2006 compliance summary for nitrogen dioxide in Victoria

AAQ NEPM standards: 0.12 ppm (1-hour average); 0.03 ppm (1-year average)
AAQ NEPM 2008 Goal: 1-hour standard exceeded on no more than 1 day per year

Region Performance monitoring station	Data availability rates (% of hours) Q1	Q2	Q3	Q4	Annual	Number of exceedences (days)	Annual mean (ppm)	Performance against the standards and goal 1-hour	1-year
Port Phillip									
Alphington[a]	94.2	64.5	94.9	92.8	86.6	0	0.012	ND	ND
Brighton	94.6	95.1	78.8	92.3	90.1	0	0.009	met	met
Footscray[a]	94.5	93.1	94.7	54.5	84.1	0	0.011	ND	ND
Geelong South	94.0	84.1	81.9	94.6	88.6	0	0.007	met	met
Point Cook[a]	88.3	94.9	93.5	66.7	85.8	0	0.005	ND	ND
RMIT (CBD)[b]	94.6	95.0	95.0	16.0	75.0	0	0.017	ND	ND
Latrobe Valley									
Moe[a]	60.2	92.5	95.6	95.6	86.1	0	0.007	ND	ND
Traralgon	94.5	95.8	94.2	95.5	95.0	0	0.007	met	met
Ballarat[c]	91.1	93.7	41.0	0.0	56.2	0	0.005	ND	ND

ND: Not demonstrated by monitoring. See comments below.
a: Reduced data capture due to station upgrade.
b: Monitoring ceased at RMIT in October.
c: Campaign monitoring ceased at Ballarat in August.

Regions which do not require monitoring on the basis of screening arguments that pollutant levels are reasonably expected to be consistently below the relevant AAQ NEPM standard: Ballarat, Bendigo, Shepparton, Warrnambool, Wodonga, Mildura.

During 2006, the nitrogen dioxide standards were not exceeded at any station and compliance was demonstrated at all stations where there was adequate data capture.

This was not the case at Alphington, Footscray, Point Cook and Moe (which were taken off-line for upgrading), RMIT (where the site lease was terminated) and Ballarat, which was a campaign station that did not operate for the full year. Monitoring at Ballarat demonstrated compliance with the standards for the 12 months from August 2005 to August 2006.

Ozone

Table 8: 2006 compliance summary for ozone in Victoria

AAQ NEPM standards: 0.10 ppm (1-hour average); 0.08 ppm (4-hour average)
AAQ NEPM 2008 Goal: Standards exceeded on no more than 1 day per year

Region / Performance monitoring station	Data availability rates (% of hours) Q1	Q2	Q3	Q4	Annual	Number of exceedences (days) 1-hour	4-hour	Performance against the standards and goal 1-hour	4-hour
Port Phillip									
Alphington[a]	93.4	65.0	94.9	91.7	86.3	3	3	not met	not met
Brighton	94.5	91.9	78.7	92.3	89.3	1	3	met	not met
Dandenong	94.5	94.3	95.3	93.7	94.4	1	1	met	met
Footscray[a]	94.5	93.8	94.7	64.4	86.8	1	3	ND	not met
Geelong South	94.0	92.2	81.9	94.5	90.6	2	2	not met	not met
Melton	95.0	92.7	95.2	95.5	94.6	1	3	met	not met
Moorooduc[b]	94.6	63.5	0.0	0.0	39.2	0	0	ND	ND
Mooroolbark	86.7	92.4	94.8	94.6	92.2	1	2	met	not met
Point Cook[a]	91.9	95.1	93.4	47.0	81.8	1	1	ND	ND
Point Henry	95.5	94.1	93.9	95.4	94.7	1	1	met	met
Latrobe Valley									
Moe[a]	61.6	90.7	95.4	95.6	85.9	1	3	ND	not met
Traralgon	95.3	95.7	95.6	93.6	95.0	3	2	not met	not met
Ballarat[c]	91.8	93.7	41.5	0.0	56.5	0	0	ND	ND
Warrnambool[d]	0.0	0.0	0.0	82.8	20.9	0	0	ND	ND

ND: Not demonstrated by monitoring. See comments below.
a: Reduced data capture due to station upgrade.
b: Campaign monitoring ceased at Moorooduc in May.
c: Campaign monitoring ceased at Ballarat in August.
d: Campaign monitoring commenced at Warrnambool in October.

Regions for which screening has not been completed: Ballarat.

During 2006, the ozone standards were exceeded more frequently than usual, and at most stations. The 2008 goal was met at only five stations for the one-hour level and two stations for the four-hour level. Where compliance was not demonstrated, this was due to data losses resulting from the upgrade program (at Footscray, Point Cook and Moe) or limited-term campaign monitoring (at Moorooduc, Ballarat and Warrnambool).

Monitoring at Moorooduc demonstrated compliance with the standards for the 17 months from December 2004 to May 2006. Monitoring at Ballarat demonstrated compliance with the standards for the 12 months from August 2005 to August 2006. Compliance will be assessed at Warrnambool after 12 months of monitoring.

Each of the recorded exceedences occurred during known bushfire impacts, as detailed in Section C. Bushfires emit both oxides of nitrogen and reactive organic compounds, which react to form ozone during transport away from the fires.

Sulfur dioxide

Table 9: 2006 compliance summary for sulfur dioxide in Victoria

AAQ NEPM standards: 0.20 ppm (1-hour average); 0.08 ppm (24-hour average); 0.02 ppm (1-year average)
AAQ NEPM 2008 Goal: 1-hour and 24-hour standards exceeded on no more than 1 day per year

Region	Data availability rates (% of hours)					Exceedences (days)		Annual mean	Performance against the standards and goal		
Performance monitoring station	Q1	Q2	Q3	Q4	Annual	1-hour	24-hour	(ppm)	1-hour	24-hour	1-year
Port Phillip											
Alphington[a]	94.2	64.5	94.9	92.8	86.6	0	0	0.001	ND	ND	ND
Altona North[a]	67.8	94.6	94.0	94.1	87.7	0	0	0.001	ND	ND	ND
Geelong South	88.7	86.1	78.2	90.4	85.8	0	0	0.001	met	met	met
RMIT (CBD)[b]	93.5	95.0	86.9	16.0	72.7	0	0	0.001	ND	ND	ND
Latrobe Valley											
Moe[a]	61.6	91.2	94.5	95.6	85.8	0	0	0.002	ND	ND	ND
Traralgon	94.5	94.2	90.3	95.3	93.6	0	0	0.003	met	met	met

ND: Not demonstrated by monitoring. See comments below.
a: Reduced data capture due to station upgrade.
b: Monitoring ceased at RMIT in October.

Regions which do not require monitoring on the basis of screening arguments that pollutant levels are reasonably expected to be consistently below the relevant AAQ NEPM standard: Ballarat, Bendigo, Shepparton, Warrnambool, Wodonga, Mildura.

During 2006, the sulfur dioxide standards were not exceeded at any station and compliance was demonstrated at all stations where there was adequate data capture. This was not the case at Alphington, Altona North and Moe (which were taken off-line for upgrading), and RMIT, where the site lease was terminated. Annual mean values are close to the limits of detection.

Lead

Following the phasing out of leaded petrol, concentrations at the peak station, Collingwood, were below the level specified for discontinuing monitoring.[8] Monitoring of lead in Melbourne ceased at the end of 2004. All other regions meet screening criteria as set out in the monitoring plan and all regions are assessed as complying with the standard and goal.

[8] National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 9, *Lead Monitoring*, available from www.ephc.gov.au.

Particles as PM_{10}

Table 10: 2006 compliance summary for PM_{10} in Victoria

AAQ NEPM Standard: 50 μg/m3 (24-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 5 days per year

Region Performance monitoring station	Data availability rates (% of days) Q1	Q2	Q3	Q4	Annual	Number of exceedences (days)	Performance against the standard and goal
Port Phillip							
Alphington[a]	100.0	54.9	100.0	93.5	87.1	8	not met
Brighton	92.2	96.7	77.2	93.5	89.9	6	not met
Dandenong	100.0	100.0	100.0	100.0	100.0	12	not met
Footscray[a]	100.0	94.5	100.0	66.3	90.1	11	not met
Geelong South	97.8	94.5	85.9	85.9	91.0	17	not met
Mooroolbark	96.7	92.3	100.0	100.0	97.3	17	not met
Richmond	97.8	92.3	100.0	100.0	97.5	9	not met
RMIT (CBD)[b]	100.0	97.8	100.0	16.3	78.4	2[f]	ND
Latrobe Valley							
Moe[a]	62.2	93.4	98.9	96.7	87.9	15	not met
Traralgon	98.9	100.0	100.0	100.0	99.7	8	not met
Ballarat[c]	100.0	100.0	43.5	0.0	60.5	0	ND
Mildura[d]	100.0	87.9	0.0	0.0	46.6	13	not met
Warrnambool[e]	0.0	0.0	0.0	87.0	21.9	3	ND

Monitoring was by TEOM unless indicated otherwise.
ND Not demonstrated by monitoring. See comments below.
a: Reduced data capture due to station upgrade.
b: Monitoring ceased at RMIT in October.
c: Campaign monitoring ceased at Ballarat in July.
d: Campaign monitoring ceased at Mildura in June.
e: Campaign monitoring commenced at Warrnambool in October.
f: At RMIT one exceedence recorded by high volume sampler but not by TEOM has been included.

Screening has not been completed for any region and regions not shown are assessed as 'not demonstrated'.

For PM_{10}, the standard was exceeded at all stations except Ballarat. Most of these exceedences were the result of bushfire smoke, as detailed in Section C.

Data capture did not meet the targets at stations taken off-line for upgrading (Alphington, Footscray, and Moe); RMIT, where the lease was terminated; and at the campaign stations Ballarat, Mildura and Warrnambool, which operated for only part of the year.

Monitoring at Ballarat demonstrated compliance with the standard for the 12 months from August 2005 to August 2006. Mildura was confirmed as a location affected by windblown dust. Compliance will be assessed at Warrnambool after 12 months of monitoring.

In addition to TEOM monitoring, PM_{10} was also monitored by high-volume sampler one-day-in-six at Alphington, Footscray (from March), Geelong South and RMIT. One additional exceedence day recorded by the high-volume sampler at RMIT has been included in Table 10. On this day the TEOM did not record for sufficient hours to form a valid daily average.

As well as bushfires, contributions to the PM_{10} exceedences include windblown dust in the warmer months and accumulation of combustion particles in poor dispersion conditions during the colder months. Details are given in Section C.

Particles as $PM_{2.5}$

Table 11: 2006 monitoring summary for $PM_{2.5}$ in Victoria

AAQ NEPM advisory reporting standards: 25 μg/m3 (24-hour average); 8 μg/m3 (1-year average)

Region Performance monitoring station	Data availability rates (% of days)					Number of exceedences (days)	Annual mean ($\mu g/m^3$)
	Q1	Q2	Q3	Q4	Annual		
Port Phillip							
Alphington[a]	**93.3**	**63.3**	**96.8**	**96.7**	**87.6**	**6**[c]	**9.3**
Footscray[b]	100.0	26.7	74.2	63.3	66.1	3[c]	7.4

Monitoring by reference method (one-day-in-three).

a: Reduced data capture due to station upgrade.

b: Reduced data capture due to station upgrade and operational difficulties.

c: One reading in Q4 was invalid because the filter became blocked by high concentrations. An exceedence has been counted although this reading is excluded from other statistics in this report.

Table 12: $PM_{2.5}$ Equivalence Program 2006 TEOM monitoring summary

Region Performance monitoring station	Data availability rates (% of days)					Annual mean ($\mu g/m^3$)
	Q1	Q2	Q3	Q4	Annual	
Port Phillip						
Alphington[a]	100.0	56.0	100.0	94.6	87.7	7.0
Footscray[a]	100.0	98.9	100.0	68.5	91.8	6.4

Monitoring by TEOM (daily).

a: Reduced data capture due to station upgrade.

The NEPM was varied in 2003 to include advisory reporting standards for particles as $PM_{2.5}$. There is no time frame for compliance, but monitoring by the reference method and other acceptable methods is required to be reported.

Table 11 summarises Victoria's monitoring of $PM_{2.5}$ by the reference method. Only reference method monitoring is to be used for comparisons with the advisory reporting standards. The goal is to gather sufficient data nationally to facilitate a review of the advisory reporting standards as part of the review of the NEPM that commenced in 2005.

Exceedences of the 24-hour standard occurred in stable conditions during the colder months. There were also some exceedences during bushfires, as detailed in Section C.

Table 12 summarises Victoria's monitoring of $PM_{2.5}$ by TEOM for the Equivalence Program. Details are given in Section C.

C. ANALYSIS OF AIR QUALITY MONITORING

Annual summary statistics that allow assessment of how close air quality was to the standards are presented in this section. The AAQ NEPM states that the short-term standards should not be exceeded on more than one day for carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide, or on more than five days per year for PM_{10}. The second highest non-overlapping daily value for the year (or the sixth for PM_{10}) can indicate the extent to which the standards are, or are not, met. Concentrations exceeding the standard are highlighted in bold.

All occasions when a standard was exceeded are listed, as are the circumstances leading to the exceedence.

Tables of monitoring statistics presented in this Section have been prepared according to AAQ NEPM guidelines.[9]

[9] National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 8, *Annual Reports*, available from www.ephc.gov.au.

Carbon monoxide

Table 13: 2006 summary statistics for daily peak eight-hour carbon monoxide in Victoria

AAQ NEPM standard: 9.0 ppm (8-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Port Phillip					
Alphington[a]	327	3.6	Jun 09:02	3.5	Jun 21:02
Geelong South	337	2.2	Jun 09:02	2.1	Jun 21:02
Richmond	348	3.2	May 28:02	2.9	Jul 15:03
			Jun 21:02		
			May 31:02		
			Jul 27:02		
RMIT (CBD)[b]	281	2.9	May 31:01	2.7	Jun 19:04
Ballarat[c]	195	3.1	Jun 10:03	2.4	Aug 05:02

a: Reduced data capture due to station upgrade.
b: Monitoring ceased at RMIT in October.
c: Campaign monitoring ceased at Ballarat in July.

Carbon monoxide levels were well within the standard at all stations. The highest readings were at the inner-suburban site Alphington, where carbon monoxide reached 40 per cent of the standard.

Nitrogen dioxide

Table 14: 2006 summary statistics for daily peak one-hour nitrogen dioxide in Victoria

AAQ NEPM standard: 0.12 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Port Phillip					
Alphington[a]	331	0.069	Dec 13:20	0.051	May 26:17
Brighton	343	0.052	Dec 13:23	0.049	Dec 09:22
Footscray[a]	320	0.071	Dec 13:21	0.066	Dec 09:20
Geelong South	339	0.043	Apr 28:14	0.040	Jul 28:08
Point Cook[a]	327	0.049	Dec 20:10		
			Jul 27:15		
RMIT (CBD)[b]	288	0.056	May 26:16	0.052	Aug 30:21
Latrobe Valley					
Moe	296	0.058	Dec 21:11	0.051	Dec 14:08
Traralgon	362	0.045	Dec 14:09	0.032	Dec 22:07
Ballarat[c]	213	0.047	Mar 23:08	0.034	Jun 08:10

a: Reduced data capture due to station upgrade.
b: Monitoring ceased at RMIT in October.
c: Campaign monitoring ceased at Ballarat in July.

Nitrogen dioxide levels were well within the standard at all stations. The highest readings at most sites occurred during December, on days influenced by bushfire smoke. The highest one-hour average occurred at Geelong South, and was 59 per cent of the hourly standard. The highest annual average was 57 per cent of the annual standard (Table 7).

Ozone

Table 15: 2006 summary statistics for daily peak one-hour ozone in Victoria

AAQ NEPM standard: 0.10 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region Performance monitoring station	**Number of valid days**	**Highest (ppm)**	**Highest (date:hour)**	**2nd highest (ppm)**	**2nd highest (date:hour)**
Port Phillip					
Alphington[a]	329	**0.127**	Dec 20:15	**0.102**	Dec 30:13
					Dec 09:12
Brighton	339	**0.114**	Dec 09:12	0.099	Dec 20:15
Dandenong	361	**0.108**	Dec 09:12	0.082	Dec 10:11
Footscray[a]	334	**0.127**	Dec 20:15	0.100	Jan 25:16
Geelong South	347	**0.169**	Dec 09:14	**0.105**	Dec 21:15
Melton	362	**0.126**	Dec 20:16	0.097	Jan 25:17
Moorooduc[b]	150	0.073	Jan 22:12	0.072	Jan 27:14
Mooroolbark	351	**0.101**	Dec 20:15	0.091	Dec 08:15
Pt Cook[a]	311	**0.104**	Dec 20:15	0.091	Jan 25:16
Pt Henry	361	**0.144**	Dec 09:13	0.086	Dec 10:10
Latrobe Valley					
Moe[a]	325	**0.104**	Dec 21:12	0.097	Dec 10:11
Traralgon	365	**0.138**	Dec 10:12	**0.115**	Dec 09:14
Ballarat[c]	**214**	**0.065**	**Jan 21:17**	**0.064**	**Mar 23:17**
Warrnambool[d]	78	0.065	Dec 09:16	0.063	Dec 21:17

a: Reduced data capture due to station upgrade.
b: Campaign monitoring ceased at Moorooduc in May.
c: Campaign monitoring ceased at Ballarat in July.
d: Campaign monitoring commenced at Warrnambool in October.

Table 16: 2006 summary statistics for daily peak four-hour ozone in Victoria

AAQ NEPM standard: 0.08 ppm (4-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region Performance monitoring station	**Number of valid days**	**Highest (ppm)**	**Highest (date:hour)**	**2nd highest (ppm)**	**2nd highest (date:hour)**
Port Phillip					
Alphington[a]	329	**0.116**	Dec 20:16	**0.091**	Dec 09:15
Brighton	339	**0.105**	Dec 09:15	**0.091**	Dec 20:16
Dandenong	360	**0.096**	Dec 09:15	0.074	Dec 10:13
Footscray[a]	333	**0.103**	Dec 20:16	**0.082**	Dec 09:16
					Jan 25:17
Geelong South	344	**0.142**	Dec 09:16	**0.084**	Dec 21:15
Melton	362	**0.115**	Dec 20:17	**0.083**	Jan 25:18
Moorooduc[b]	150	0.071	Jan 22:14	0.069	Jan 27:15
Mooroolbark	351	**0.091**	Dec 20:16	0.089	Dec 09:15
Point Cook[a]	310	**0.089**	Dec 20:16	0.078	Jan 25:17
Point Henry	359	**0.126**	Dec 09:16	0.078	Dec 10:13
Latrobe Valley					
Moe[a]	324	**0.094**	Dec 21:15	**0.092**	Dec 10:13
Traralgon	362	**0.123**	Dec 10:14	**0.091**	Dec 09:16
Ballarat[c]	213	0.061	Feb 23:20	0.060	Jan 21:17
Warrnambool[d]	78	0.063	Dec 09:17	0.058	Dec 21:13

a: Reduced data capture due to station upgrade.
b: Campaign monitoring ceased at Moorooduc in May.
c: Campaign monitoring ceased at Ballarat in July.
d: Campaign monitoring commenced at Warrnambool in October.

Ozone is generated by chemical reactions in strong sunlight as precursor chemicals are transported from the point of emission. Ozone events in Melbourne typically occur when air masses are recirculated back into the metropolitan area. Compared to their respective standards, the four-hour averages are usually proportionally higher than one-hour averages, leading to more exceedences of the four-hour standard.

The recorded exceedences of the one-hour and four-hour standards are shown in Table 17. All exceedences occurred on days when visible smoke from bushfires indicated that ozone would have been formed from oxides of nitrogen and reactive hydrocarbons emitted by the fires.

Table 17: 2006 ozone exceedences

AAQ NEPM standards: 0.10 ppm (1-hour average), 0.08 ppm (4-hour average)

AAQ NEPM 2008 Goal: Standards exceeded on no more than 1 day per year

Date	**Port Phillip**									**Latrobe Valley**		**Inferred cause**
Averaging period	Alph-ington	Bright-on	Dande-nong	Foots-cray	Geelong South	Melton	Moorool-bark	Point Cook	Point Henry	Moe	Trar-algon	
25Jan06												Bushfire
1 h ave												
4 h ave		0.082		0.082		0.083						
09Dec06												Bushfire
1 h ave	0.102	0.114	0.108		0.169				0.144		0.115	
4 h ave	0.091	0.105	0.096	0.082	0.142	0.081	0.089		0.126	0.082	0.091	
10Dec06												Bushfire
1 h ave											0.138	
4 h ave										0.092	0.123	
14Dec06												Bushfire
1 h ave											0.102	
4 h ave												
20Dec06												Bushfire
1 h ave	0.127			0.127		0.126	0.101	0.104				
4 h ave	0.116	0.091		0.103		0.115	0.091	0.089				
21Dec06												Bushfire
1 h ave					0.105					0.104		
4 h ave					0.084					0.094		
30Dec06												Bushfire
1 h ave	0.102											
4 h ave	0.087											

Sulfur dioxide

Table 18: 2006 summary statistics for daily peak one-hour sulfur dioxide in Victoria

AAQ NEPM standard: 0.20ppm (1-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Port Phillip					
Alphington[a]	331	0.013	Feb 01:14	0.012	Jun 10:13
Altona North[a]	337	0.053	Oct 27:18	0.049	Apr 21:11
Geelong South	340	0.045	Feb 08:23	0.036	Jun 08:15
RMIT (CBD)[b]	278	0.034	Feb 01:12	0.021	Jun 10:12
					May 19:19
Latrobe Valley					
Moe[a]	323	0.046	Jan 08:11	0.033	Dec 12:11
Traralgon	356	0.095	Feb 27:16	0.068	Feb 04:13

a: Reduced data capture due to station upgrade. b: Monitoring ceased at RMIT in October.

Table 19: 2006 summary statistics for daily peak 24-hour sulfur dioxide in Victoria

AAQ NEPM standard: 0.08ppm (24-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date)	2nd highest (ppm)	2nd highest (date)
Port Phillip					
Alphington[a]	331	0.004	May 26	0.003	Aug 03
					Jul 26
					Jul 24
					Jul 03
					Jun 22
					Jun 20
					Jun 10
					Jun 05
					May 30
					May 19
					Apr 08
					Feb 01
Altona North[a]	337	0.019	Apr 08	0.012	Oct 27
Geelong South	340	0.005	Dec 21		
			Nov 20		
			Jun 08		
			May 15		
			Apr 23		
RMIT (CBD)[b]	278	0.008	Feb 01	0.006	Jun 10
					Apr 24
Latrobe Valley					
Moe[a]	323	0.009	Jan 08	0.008	Nov 27
					Feb 22
Traralgon	353	0.023	Feb 27	0.008	Jul 07
					Feb 04

a: Reduced data capture due to station upgrade. b: Monitoring ceased at RMIT in October.

Sulfur dioxide levels were well within the standards at all stations. One-hour averages are higher relative to the standard than 24-hour or annual averages. The highest readings occurred in the Latrobe Valley and were 48 per cent of the one-hour standard and 29 per cent of the 24-hour standard. The elevated concentration lasted approximately six hours and was the highest since 1997 (Table 52). The station with the highest annual average was approximately 15 per cent of the annual standard (Table 9).

Particles as PM_{10}

Table 20: 2006 summary statistics for 24-hour PM_{10} in Victoria

AAQ NEPM standard: 50 μg/m3 (24-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 5 days per year

Region Performance monitoring station	Number of valid days	Highest ($\mu g/m^3$)	Highest (date)	6th highest ($\mu g/m^3$)	6th highest (date)
Port Phillip					
Alphington[a]	318	**154.7**	Dec 20	**60.1**	Dec 21
Brighton	328	**109.1**	Dec 20	**58.0**	Nov 21
Dandenong	365	**149.2**	Dec 13	**77.7**	Nov 21
Footscray[a]	329	**124.5**	Dec 20	**60.6**	Dec 22
Geelong South	332	**116.4**	Dec 22	**90.3**	Dec 21
Mooroolbark	355	**219.9**	Dec 20	**87.4**	Dec 30
Richmond	356	**140.0**	Dec 20	**59.9**	Dec 21
RMIT (CBD)[b]	286	**58.0**	Apr 27	42.1	Jun 09
Latrobe Valley					
Moe[a]	321	**254.0**	Dec 14	**92.1**	Dec 08
Traralgon	364	**193.5**	Dec 21	**71.8**	Dec 09
Ballarat[c]	221	43.8	Mar 12	36.0	May 18
Mildura[d]	170	**227.9**	Jan 23	**65.7**	Jun 14
Warrnambool[e]	80	**66.8**	Dec 21	42.1	Oct 12

a: Reduced data capture due to station upgrade.
b: Monitoring ceased at RMIT in October.
c: Campaign monitoring ceased at Ballarat in July.
d: Campaign monitoring ceased at Mildura in June.
e: Campaign monitoring commenced at Warrnambool in October.

In addition to TEOM monitoring, PM_{10} was monitored by high-volume sampler one day in six at Alphington, Footscray, Geelong South and RMIT (CBD) throughout the year. The highest high-volume sampler readings were 45.0, 51.7, 61.4 and 58.0 $\mu g/m^3$, respectively. All exceedence days at these stations were also recorded by TEOMs, except for 27 April at RMIT. On this day the TEOM at RMIT did not record enough hours to form a valid daily average and the high-volume sampler reading (58.0 $\mu g/m^3$) has been used.

In 2006 PM_{10} exceedences occurred on the days listed in Table 21. The likely causes have been inferred, with the majority of exceedences attributed to bushfire smoke, most of them in December. These fires impacted regions throughout Victoria and continued into January 2007. Major fires occurred in alpine areas, northeast Victoria, Gippsland and western Victoria, burning approximately 20 per cent of the State. Windborne dust caused a number of exceedences, including a widespread event on 21 November.

Other dust events were due to localised influences near the monitoring stations, such as the agricultural shows at Geelong (19–21 October) and Dandenong (11 November). The standard is also exceeded in stable atmospheric conditions with low winds, which allow combustion particle emissions to accumulate, especially in colder weather.

Table 21: 2006 PM_{10} exceedences

AAQ NEPM standard: 50 μg/m3 (24-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 5 days per year

Date	Port Phillip								Latrobe Valley		Rural		Inferred cause[a]
	Alph-ington	Bright-on	Dandenong	Footscray	Geelong South	Moorool-bark	Rich-mond	RMIT	Moe	Trar-algon	Mild-ura	Warrn-ambool	
17Jan											65.3		Dust
20Jan					54.6								Dust
22Jan									57.5				Fire
22Jan											56.6		Dust
23Jan											227.9		Fire
25Jan				56.7		69.5							Fire
26Jan					51.1	63.7					64.5		Fire
27Jan				53.1	63.3						60.4		Fire
01Feb											73.1		Dust
08Feb				51.0									Dust
07Mar											71.5		Urban
09Mar											55.9		Urban
12Mar											93.3		Dust
05Apr											67.0		Dust
11Apr					70.2								Dust
27Apr								58.0					Urban
28Apr						63.3							Urban
25May											53.7		Urban
09Jun						58.5							Urban
14Jun											65.7		Urban
15Jun											55.6		Urban
01Sep					52.7								Dust
18Sep						50.9							Urban
12Oct			60.1					53.0					Dust
19Oct					57.0								Dust
21Oct					56.3								Dust
11Nov			65.3										Dust
21Nov	59.8	58.0	77.7		106.1	67.3	57.2		66.5				Dust
30Nov				50.6	54.8								Fire
05Dec					50.2	64.9			82.0	79.5			Fire
08Dec			58.1			63.7			92.1				Fire
09Dec	91.0	105.1	126.0	109.3	115.3	196.3	102.8		87.3	71.8		62.5	Fire
10Dec	82.6	84.7	92.4	81.4	91.9	118.8	89.2		144.3	149.0		52.9	Fire
11Dec				55.3									Fire
13Dec	120.3	107.1	149.2	109.1	100.7	156.0	118.4		99.3	50.6			Fire
14Dec	82.0	59.9	90.2	65.6	75.4	83.9	70.0		254.0	191.0			Fire
17Dec									60.1				Fire
18Dec									54.3	50.4			Fire
19Dec									57.3				Fire
20Dec	154.7	109.1	120.9	124.5	50.4	219.9	140.0		163.9				Fire
21Dec	60.1		73.7		90.3	162.8	59.9		214.7	193.5		66.8	Fire
22Dec	55.8		75.5	60.6	116.4	53.2	53.8		64.9	87.8			Fire
30Dec			54.4			87.4	50.4						Fire
31Dec						63.9			61.0				Fire
Total	8	6	12	11	17	17	9	2	15	8	13	3	

All readings in μg/m^3.

a: Dust = windborne crustal dust, often from distant sources.
Fire = smoke from bushfires or prescribed burning.
Urban = particles accumulating in stable atmospheric conditions, typically from motor vehicles or domestic wood heaters.

Particles as $PM_{2.5}$

Table 22: 2006 summary statistics for 24-hour $PM_{2.5}$ in Victoria

AAQ NEPM advisory reporting standard: 25μg/m3 (24-hour average)

Region Performance monitoring station	Number of valid days	Highest (μg/m³)	Highest (date)
Port Phillip			
Alphington[a]	106	52.3	Dec 14
Footscray[b]	80	34.1	Dec 14

Monitoring by reference method (one-day-in-three).
a: Reduced data capture due to station upgrade.
b: Reduced data capture due to station upgrade and operational difficulties.

The 24-hour reporting standard for $PM_{2.5}$ was exceeded at both stations and the annual reporting standard was exceeded at Alphington (Table 11).

Results of $PM_{2.5}$ monitoring by TEOM (Table 23) are not adjusted for loss of volatiles and are often lower than the reference method results. On the day the highest TEOM values were recorded (20 December) the reference method filter became blocked and could not provide valid readings.

Table 23: $PM_{2.5}$ Equivalence Program 2006 TEOM monitoring – daily statistics

Region Performance monitoring station	Number of valid days	Highest (μg/m³)	Highest (date)
Port Phillip			
Alphington	320	112.6	Dec 20
Footscray	335	95.7	Dec 20

24-hour exceedences occurred on bushfire days. Alphington also recorded exceedences when poor dispersion conditions caused the accumulation of pollution (Table 24).

Table 24: 2006 $PM_{2.5}$ exceedences

AAQ NEPM standard: 25 μg/m3 (24-hour average)

Date	Port Phillip		Inferred Cause[a]
	Alphington	Footscray	
Jan27		27.4	Fire
May27	30.2		Urban
Jun5	25.4		Urban
Jun8	27.8		Urban
Jun20	36.2		Urban
Dec14	52.3	34.1	Fire
Dec20	b	b	Fire

All readings in μg/m³. Measured by reference method.
a: Fire = smoke from bushfires or prescribed burning.
Urban = particles accumulating in stable atmospheric conditions, typically from vehicle traffic or domestic wood heaters.
b: Filters were blocked by high concentrations which probably would have exceeded the standard.

Summary of progress towards achieving the AAQ NEPM 2008 goal

Compliance

The AAQ NEPM goal for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead and PM_{10} is to achieve the standards, to the extent specified by the number of allowed exceedences, by 2008. In 2006, at all stations where there was sufficient data capture to make the assessment, the 2008 goal was met for all pollutants except for ozone and PM_{10}.

Extensive and long-lasting bushfires resulted in the 2008 goal not being achieved for ozone and PM_{10} (see Table 17 and Table 21). Only Dandenong and Point Henry met the 2008 goal in relation to one-hour and four-hour ozone but each of these stations exceeded both standards on one day. The 2008 goal for PM_{10} was not met at any station.

The AAQ NEPM goal for $PM_{2.5}$ is to gather sufficient data to facilitate a review of the advisory reporting standards as part of the review of the NEPM. $PM_{2.5}$ has been monitored at two stations in the Port Phillip region.

Data capture

Compliance with the standards and goal can only be demonstrated if data capture is at least 75 per cent in each quarter of the year.[10] In 2006 this requirement was achieved for all pollutants at all stations that operated continuously throughout the year. Stations that did not operate continuously throughout the year were:

- those taken off-line as part of EPA's three-year program to replace and upgrade instrumentation

[10] National Environment Protection (Ambient Air Quality) Measure Technical paper No. 8, *Annual Reports*, available from www.ephc.gov.au.

and infrastructure at all of its monitoring stations (Alphington, Altona North, Brighton, Footscray, Geelong South, Moe and Point Cook)

- campaign stations, which were planned to operate for only part of the year (Ballarat, Mildura, Moorooduc, Warrnambool).

The campaign stations at Ballarat and Moorooduc completed their planned campaign monitoring without recording any exceedences. Ballarat results for July 2005 to July 2006 did not exceed the standards for carbon monoxide, nitrogen dioxide, ozone and PM_{10}. Moorooduc results for December 2004 to May 2006 did not exceed the standards for ozone.

Screening

In addition to screening in the monitoring plan, procedures have been invoked for screening carbon monoxide and nitrogen dioxide in the six rural regions and ozone in five of the six. PM_{10} has not been screened in these regions. Regions which do not require monitoring on the basis of screening procedures are listed below the compliance summary tables (Tables 6 to 10).

Compliance in regions where screening criteria have not been met is reported as 'not demonstrated'.

D. DATA ANALYSIS

Results of further analysis of the monitoring data are presented in this section. In these tables daily peak values are formed only when at least 75 per cent of the data for the day are valid. Data for stations with less than 15 per cent data availability are omitted and stations with less than 75 per cent data availability are shown in italics. Exceedences are shown in bold. The percentiles for 8-hour carbon monoxide and 4-hour ozone are based on running averages, including those that overlap from one day to the next.

Percentiles of 2006 daily peak concentrations are presented for each station and standard. Annual statistics for the past ten years are also presented for trend stations with at least five years of data. Trends at different stations and for different statistics have different statistical significance and in most cases there is no obvious overall trend over the ten-year period shown, in spite of increasing population pressures. Lead is an exception, where annual averages have decreased markedly, so that monitoring is no longer necessary. Carbon monoxide has also decreased over the period.

Carbon monoxide

Table 25: 2006 percentiles of daily peak eight-hour carbon monoxide concentrations in Victoria

AAQ NEPM standard: 9.0 ppm (8-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region	**Data availability**	**Max**	**Percentiles (ppm)**					
Performance monitoring station	**(% of days)**	**(ppm)**	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	89.6	3.6	3.2	3.0	2.5	1.9	1.0	0.6
Geelong South	92.3	2.2	1.9	1.6	1.2	0.7	0.3	0.1
Richmond	95.3	3.2	2.9	2.8	2.3	1.7	0.7	0.3
RMIT (CBD)	77.0	2.9	2.5	2.0	1.7	1.5	1.0	0.6
Ballarat	*53.4*	*3.1*	*2.3*	*1.6*	*1.1*	*0.7*	*0.2*	*0.1*

Stations with data availability below 75 per cent shown in italics.

Table 26: Percentiles of daily maximum eight-hour carbon monoxide at Alphington (1997–2006)

AAQ NEPM standard: 9.0 ppm (8-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	98.9	0	6.5	5.5	4.4	3.4	2.6	1.5	0.8
1998	95.3	0	6.8	6.0	5.1	3.9	2.7	1.7	0.7
1999	*55.1*	*0*	*6.2*	*4.7*	*4.1*	*3.0*	*2.1*	*1.1*	*0.6*
2000	96.7	0	5.0	4.5	4.3	3.1	2.4	1.2	0.6
2001	92.9	0	5.2	3.8	3.4	2.9	2.0	1.1	0.6
2002	93.7	0	3.8	3.5	3.1	2.7	2.0	0.9	0.4
2003	96.7	0	5.4	3.9	3.5	2.7	1.8	0.9	0.5
2004	97.0	0	3.7	2.4	2.3	1.7	1.3	0.8	0.5
2005	93.7	0	3.1	2.5	2.4	2.0	1.6	0.9	0.6
2006	89.6	0	3.6	3.2	3.0	2.5	1.9	1.0	0.6

Years with data availability below 75 per cent shown in italics.

Table 27: Percentiles of daily maximum eight-hour carbon monoxide at Geelong South (1998–2006)

AAQ NEPM standard: 9.0 ppm (8-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1998	*66.0*	*0*	*3.3*	*2.8*	*2.6*	*2.3*	*1.6*	*0.7*	*0.4*
1999	92.6	0	3.0	2.7	2.3	1.6	1.1	0.7	0.3
2000	85.8	0	2.7	2.1	1.9	1.4	1.0	0.5	0.3
2001	87.7	0	2.2	1.9	1.6	1.2	0.9	0.5	0.2
2002	87.1	0	2.3	1.8	1.4	1.0	0.6	0.3	0.1
2003	87.1	0	3.2	1.8	1.6	1.1	0.7	0.4	0.2
2004	85.8	0	2.6	1.7	1.6	0.9	0.6	0.4	0.1
2005	96.4	0	3.5	1.8	1.5	0.9	0.7	0.2	0.1
2006	92.3	0	2.2	1.9	1.6	1.2	0.7	0.3	0.1

Years with data availability below 75 per cent shown in italics.

Table 28: Percentiles of daily maximum eight-hour carbon monoxide at RMIT (CBD) (1997–2006)

AAQ NEPM standard: 9.0ppm (8-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	98.4	0	5.5	4.3	3.8	2.9	2.4	1.4	0.9
1998	86.3	0	5.9	4.7	4.4	3.0	2.1	1.4	0.8
1999	*35.6*	*0*	*5.9*	*5.0*	*3.3*	*2.7*	*2.0*	*1.5*	*1.2*
2000	96.4	0	5.0	3.4	3.2	2.5	1.8	1.1	0.8
2001	88.8	0	3.6	2.7	2.4	2.1	1.7	1.1	0.7
2002	85.2	0	3.2	2.9	2.7	1.8	1.5	0.9	0.5
2003	96.7	0	3.9	3.0	2.6	1.8	1.5	0.9	0.6
2004	91.5	0	2.1	1.9	1.8	1.5	1.2	0.8	0.6
2005	95.3	0	2.3	2.1	1.9	1.7	1.3	0.9	0.6
2006	77.0	0	2.9	2.5	2.0	1.7	1.5	1.0	0.6

Years with data availability below 75 per cent shown in italics.

Nitrogen dioxide

Table 29: 2006 percentiles of daily peak one-hour nitrogen dioxide concentrations in Victoria

AAQ NEPM standard: 0.12 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	90.7	0.069	0.044	0.042	0.038	0.034	0.030	0.024
Brighton	94.0	0.052	0.045	0.040	0.036	0.032	0.026	0.019
Footscray	87.7	0.071	0.051	0.046	0.040	0.034	0.028	0.022
Geelong South	92.9	0.043	0.036	0.034	0.028	0.026	0.022	0.016
Point Cook	89.6	0.049	0.047	0.043	0.033	0.028	0.022	0.014
RMIT (CBD)	78.9	0.056	0.051	0.048	0.044	0.040	0.033	0.028
Latrobe Valley								
Moe	81.1	0.058	0.030	0.029	0.026	0.024	0.020	0.016
Traralgon	99.2	0.045	0.027	0.026	0.025	0.023	0.020	0.015
Ballarat	*58.4*	*0.047*	*0.033*	*0.030*	*0.027*	*0.025*	*0.019*	*0.011*

Stations with data availability below 75 per cent shown in italics.

Table 30: Percentiles of daily maximum one-hour nitrogen dioxide at Alphington (1997–2006)

AAQ NEPM standard: 0.12ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1997	84.4	0	0.075	0.059	0.051	0.044	0.038	0.030	0.025
1998	95.9	0	0.073	0.058	0.055	0.045	0.039	0.031	0.026
1999	97.5	0	0.065	0.046	0.045	0.038	0.035	0.029	0.025
2000	89.0	0	0.069	0.053	0.048	0.040	0.035	0.029	0.024
2001	90.4	0	0.060	0.052	0.047	0.039	0.034	0.029	0.024
2002	93.7	0	0.060	0.048	0.046	0.038	0.034	0.030	0.023
2003	90.1	0	0.065	0.050	0.046	0.037	0.032	0.027	0.023
2004	95.6	0	0.056	0.044	0.039	0.034	0.032	0.028	0.023
2005	94.8	0	0.050	0.043	0.039	0.035	0.033	0.027	0.022
2006	90.7	0	0.069	0.044	0.042	0.038	0.034	0.030	0.024

Table 31: Percentiles of daily maximum one-hour nitrogen dioxide at Footscray (1997–2006)

AAQ NEPM standard: 0.12 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1997	98.1	0	0.088	0.066	0.058	0.048	0.040	0.032	0.026
1998	89.9	0	0.070	0.057	0.053	0.048	0.042	0.032	0.024
1999	97.8	0	0.081	0.057	0.051	0.045	0.040	0.033	0.026
2000	82.7	0	0.070	0.060	0.054	0.046	0.039	0.030	0.025
2001	*32.6*	*0*	*0.041*	*0.040*	*0.039*	*0.036*	*0.033*	*0.028*	*0.021*
2002	91.8	0	0.059	0.055	0.049	0.040	0.035	0.029	0.022
2003	97.8	0	0.065	0.058	0.054	0.044	0.037	0.029	0.022
2004	95.6	0	0.056	0.047	0.044	0.040	0.035	0.029	0.023
2005	99.5	0	0.053	0.046	0.043	0.038	0.034	0.027	0.021
2006	87.7	0	0.071	0.051	0.046	0.040	0.034	0.028	0.022

Years with data availability below 75 per cent shown in italics.

Table 32: Percentiles of daily maximum one-hour nitrogen dioxide at Geelong South (1998–2006)

AAQ NEPM standard: 0.12 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1998	*68.5*	*0*	*0.067*	*0.039*	*0.037*	*0.034*	*0.032*	*0.026*	*0.020*
1999	93.7	0	0.046	0.038	0.035	0.031	0.028	0.022	0.016
2000	85.2	0	0.048	0.038	0.037	0.028	0.024	0.019	0.015
2001	91.2	0	0.047	0.035	0.032	0.029	0.027	0.022	0.015
2002	94.2	0	0.056	0.036	0.031	0.027	0.025	0.019	0.012
2003	87.7	0	0.050	0.034	0.033	0.028	0.025	0.021	0.014
2004	93.2	0	0.050	0.037	0.030	0.027	0.024	0.020	0.015
2005	98.1	0	0.048	0.038	0.034	0.029	0.026	0.021	0.015
2006	92.9	0	0.043	0.036	0.034	0.028	0.026	0.022	0.016

Years with data availability below 75 per cent shown in italics.

Table 33: Percentiles of daily maximum one-hour nitrogen dioxide at Point Cook (1998–2006)

AAQ NEPM standard: 0.12 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1998	92.1	0	0.064	0.049	0.046	0.036	0.028	0.022	0.015
1999	84.4	0	0.044	0.037	0.036	0.032	0.028	0.018	0.011
2000	*68.8*	*0*	*0.048*	*0.043*	*0.039*	*0.032*	*0.028*	*0.020*	*0.014*
2001	87.7	0	0.054	0.044	0.040	0.033	0.029	0.022	0.015
2002	96.2	0	0.056	0.045	0.041	0.031	0.027	0.021	0.013
2003	93.2	0	0.064	0.048	0.044	0.031	0.028	0.020	0.013
2004	94.8	0	0.066	0.041	0.035	0.030	0.026	0.020	0.013
2005	96.7	0	0.043	0.039	0.037	0.032	0.027	0.021	0.014
2006	89.6	0	0.049	0.047	0.043	0.033	0.028	0.022	0.014

Years with data availability below 75 per cent shown in italics.

Table 34: Percentiles of daily maximum one-hour nitrogen dioxide at RMIT (CBD) (1997–2006)

AAQ NEPM standard: 0.12 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	90.4	0	0.100	0.074	0.065	0.055	0.046	0.039	0.032
1998	83.8	0	0.089	0.067	0.057	0.049	0.046	0.036	0.028
1999	97.3	0	0.078	0.062	0.050	0.045	0.041	0.033	0.028
2000	91.5	0	0.090	0.064	0.058	0.049	0.041	0.032	0.026
2001	93.4	0	0.071	0.055	0.050	0.043	0.036	0.029	0.024
2002	94.2	0	0.079	0.053	0.046	0.039	0.035	0.028	0.023
2003	98.9	0	0.069	0.059	0.053	0.045	0.039	0.032	0.026
2004	93.7	0	0.075	0.049	0.046	0.040	0.037	0.031	0.026
2005	98.1	0	0.058	0.050	0.047	0.041	0.037	0.032	0.027
2006	78.9	0	0.056	0.051	0.048	0.044	0.040	0.033	0.028

Table 35: Percentiles of daily maximum one-hour nitrogen dioxide at Traralgon (1997–2006)

AAQ NEPM standard: 0.12 ppm (1-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm) 99th	98th	95th	90th	75th	50th
1997	*64.7*	*0*	*0.038*	*0.037*	*0.034*	*0.031*	*0.028*	*0.024*	*0.018*
1998	89.0	0	0.036	0.030	0.029	0.027	0.025	0.022	0.016
1999	80.8	0	0.042	0.034	0.031	0.028	0.027	0.023	0.018
2000	98.4	0	0.041	0.037	0.033	0.027	0.025	0.021	0.017
2001	98.9	0	0.033	0.031	0.026	0.024	0.022	0.019	0.015
2002	98.1	0	0.033	0.031	0.030	0.027	0.025	0.020	0.015
2003	99.2	0	0.053	0.032	0.030	0.028	0.026	0.022	0.016
2004	98.6	0	0.036	0.034	0.030	0.028	0.024	0.019	0.015
2005	91.5	0	0.040	0.032	0.030	0.028	0.026	0.023	0.016
2006	99.2	0	0.045	0.027	0.026	0.025	0.023	0.020	0.015

Years with data availability below 75 per cent shown in italics.

Ozone

Table 36: 2006 percentiles of daily peak one-hour ozone concentrations in Victoria

AAQ NEPM standard: 0.10 ppm (1-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region Performance monitoring station	Data availability (% of days)	Max (ppm)	Percentiles (ppm) 99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	90.1	**0.127**	0.084	0.068	0.059	0.048	0.033	0.026
Brighton	92.9	**0.114**	0.080	0.072	0.059	0.046	0.032	0.026
Dandenong	98.9	**0.108**	0.067	0.065	0.057	0.046	0.033	0.027
Footscray	91.5	**0.127**	0.082	0.066	0.053	0.041	0.030	0.024
Geelong South	95.1	**0.169**	0.076	0.062	0.049	0.040	0.031	0.026
Melton	99.2	**0.126**	0.084	0.067	0.053	0.046	0.036	0.030
Moorooduc	*41.1*	*0.073*	*0.070*	*0.068*	*0.059*	*0.052*	*0.031*	*0.026*
Mooroolbark	96.2	**0.101**	0.086	0.071	0.058	0.048	0.036	0.028
Point Cook	85.2	**0.104**	0.069	0.062	0.048	0.039	0.029	0.026
Point Henry	98.9	**0.144**	0.070	0.057	0.047	0.039	0.030	0.026
Latrobe Valley								
Moe	89.0	**0.104**	0.077	0.069	0.051	0.041	0.030	0.027
Traralgon	100.0	**0.138**	0.083	0.077	0.052	0.044	0.033	0.027
Ballarat	*58.6*	*0.065*	*0.062*	*0.058*	*0.053*	*0.045*	*0.031*	*0.027*
Warrnambool	*21.4*	*0.065*	*0.064*	*0.058*	*0.048*	*0.042*	*0.032*	*0.026*

Stations with data availability below 75 per cent shown in italics. Exceedences shown in bold.

Table 37: 2006 percentiles of daily peak four-hour ozone concentrations in Victoria

AAQ NEPM standard: 0.08 ppm (4-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	90.1	**0.116**	0.073	0.063	0.054	0.045	0.031	0.025
Brighton	91.8	**0.104**	0.065	0.057	0.046	0.038	0.030	0.026
Dandenong	92.9	**0.105**	0.075	0.065	0.054	0.043	0.031	0.025
Footscray	91.2	**0.103**	0.070	0.059	0.047	0.040	0.028	0.023
GeelongSouth	94.2	**0.142**	0.070	0.059	0.047	0.038	0.030	0.025
Melton	99.2	**0.115**	0.073	0.060	0.051	0.043	0.034	0.029
Moorooduc	*41.1*	*0.071*	*0.067*	*0.062*	*0.054*	*0.049*	*0.031*	*0.025*
Mooroolbark	96.2	**0.091**	0.077	0.064	0.054	0.045	0.034	0.026
Point Cook	84.9	**0.089**	0.061	0.057	0.046	0.036	0.027	0.025
Point Henry	98.4	**0.126**	0.067	0.053	0.043	0.036	0.029	0.025
Latrobe Valley								
Moe	88.8	**0.094**	0.065	0.056	0.047	0.038	0.030	0.025
Traralgon	100.0	**0.123**	0.072	0.067	0.046	0.041	0.031	0.026
Ballarat	*58.4*	*0.061*	*0.057*	*0.054*	*0.048*	*0.042*	*0.029*	*0.026*
Warnambool	*21.3*	*0.063*	*0.059*	*0.055*	*0.045*	*0.039*	*0.032*	*0.025*

Stations with data availability below 75 per cent shown in italics. Exceedences shown in bold.

Table 38: Percentiles of daily maximum one-hour ozone at Brighton (1997–2006)

AAQ NEPM standard: 0.10 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1997	**95.6**	**3**	**0.112**	**0.082**	**0.072**	**0.056**	**0.039**	**0.028**	**0.024**
1998	95.6	0	0.085	0.070	0.060	0.050	0.037	0.027	0.022
1999	99.5	0	0.070	0.067	0.063	0.052	0.041	0.030	0.024
2000	96.4	0	0.073	0.068	0.060	0.048	0.041	0.028	0.023
2001	80.3	0	0.078	0.071	0.058	0.049	0.039	0.029	0.024
2002	93.7	0	0.085	0.063	0.053	0.043	0.036	0.029	0.025
2003	99.2	2	**0.109**	0.070	0.065	0.056	0.046	0.029	0.025
2004	94.5	1	**0.106**	0.062	0.058	0.043	0.039	0.030	0.025
2005	97.8	0	0.088	0.067	0.053	0.047	0.040	0.032	0.028
2006	92.9	1	**0.114**	0.080	0.072	0.059	0.046	0.032	0.026

Exceedences shown in bold.

Table 39: Percentiles of daily maximum one-hour ozone at Footscray (1997–2006)

AAQ NEPM standard: 0.10 ppm (1-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	98.1	1	**0.105**	0.090	0.073	0.055	0.042	0.030	0.025
1998	94.2	1	**0.113**	0.064	0.059	0.048	0.038	0.028	0.023
1999	95.9	0	0.079	0.070	0.066	0.054	0.041	0.032	0.025
2000	88.2	0	0.064	0.054	0.052	0.046	0.038	0.027	0.022
2001	*34.5*	*0*	*0.044*	*0.043*	*0.041*	*0.038*	*0.036*	*0.030*	*0.026*
2002	96.7	0	0.095	0.066	0.047	0.042	0.038	0.028	0.024
2003	98.1	1	**0.105**	0.072	0.061	0.051	0.041	0.027	0.023
2004	94.8	1	**0.106**	0.058	0.049	0.042	0.036	0.028	0.024
2005	99.2	0	0.082	0.063	0.052	0.044	0.039	0.031	0.027
2006	91.5	1	**0.127**	0.082	0.066	0.053	0.041	0.030	0.024

Years with data availability below 75 per cent shown in italics. Exceedences shown in bold.

Table 40: Percentiles of daily maximum one-hour ozone at Geelong South (1998–2006)

AAQ NEPM standard: 0.10 ppm (1-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1998	95.3	0	0.083	0.056	0.046	0.035	0.031	0.027	0.024
1999	95.3	0	0.073	0.053	0.048	0.040	0.033	0.027	0.022
2000	88.8	0	0.065	0.057	0.049	0.040	0.033	0.021	0.017
2001	92.3	0	0.082	0.064	0.057	0.040	0.032	0.024	0.020
2002	90.7	0	0.058	0.056	0.053	0.043	0.032	0.025	0.021
2003	97.3	0	0.081	0.069	0.063	0.043	0.033	0.023	0.020
2004	92.1	0	0.094	0.061	0.058	0.044	0.035	0.030	0.025
2005	97.8	0	0.080	0.059	0.056	0.046	0.039	0.031	0.028
2006	95.1	2	**0.169**	0.076	0.062	0.049	0.040	0.031	0.026

Exceedences shown in bold.

Table 41: Percentiles of daily maximum one-hour ozone at Point Cook (1997–2006)

AAQ NEPM standard: 0.10 ppm (1-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	86.8	2	**0.126**	0.080	0.064	0.049	0.037	0.030	0.025
1998	94.5	1	**0.107**	0.083	0.063	0.044	0.034	0.025	0.021
1999	91.2	0	0.083	0.071	0.067	0.055	0.040	0.028	0.023
2000	85.2	0	0.079	0.067	0.063	0.049	0.040	0.032	0.028
2001	91.0	0	0.099	0.072	0.064	0.050	0.044	0.031	0.025
2002	97.0	0	0.093	0.068	0.063	0.048	0.039	0.030	0.027
2003	97.0	0	0.094	0.080	0.069	0.053	0.041	0.031	0.025
2004	98.6	0	0.093	0.065	0.056	0.047	0.039	0.028	0.025
2005	97.0	0	0.092	0.068	0.059	0.047	0.038	0.031	0.027
2006	85.2	1	**0.104**	0.069	0.062	0.048	0.039	0.029	0.026

Exceedences shown in bold.

Table 42: Percentiles of daily maximum one-hour ozone at Traralgon (1997–2006)

AAQ NEPM standard: 0.10 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	*60.3*	*0*	*0.072*	*0.058*	*0.057*	*0.052*	*0.041*	*0.030*	*0.025*
1998	92.3	0	0.075	0.062	0.054	0.044	0.037	0.030	0.026
1999	*31.8*	*0*	*0.060*	*0.055*	*0.050*	*0.043*	*0.036*	*0.028*	*0.023*
2000	96.2	0	0.056	0.050	0.047	0.039	0.033	0.027	0.023
2001	97.0	0	0.064	0.053	0.048	0.040	0.034	0.028	0.024
2002	100.0	0	0.057	0.048	0.043	0.036	0.033	0.029	0.024
2003	97.3	0	0.077	0.062	0.060	0.049	0.037	0.030	0.024
2004	97.5	0	0.058	0.049	0.048	0.042	0.037	0.031	0.025
2005	86.3	0	0.067	0.050	0.046	0.040	0.035	0.031	0.026
2006	100.0	3	**0.138**	0.083	0.077	0.052	0.044	0.033	0.027

Years with data availability below 75 per cent shown in italics. Exceedences shown in bold.

Table 43: Percentiles of daily maximum four-hour ozone at Brighton (1997–2006)

AAQ NEPM standard: 0.08 ppm (4-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	95.6	3	**0.097**	0.068	0.062	0.049	0.037	0.026	0.023
1998	95.6	1	**0.082**	0.062	0.055	0.042	0.034	0.026	0.021
1999	99.5	0	0.069	0.059	0.056	0.047	0.037	0.028	0.022
2000	96.4	0	0.064	0.061	0.052	0.044	0.038	0.026	0.022
2001	80.0	0	0.068	0.059	0.055	0.046	0.038	0.027	0.022
2002	93.2	0	0.072	0.056	0.048	0.039	0.034	0.028	0.023
2003	98.4	2	**0.102**	0.065	0.061	0.048	0.042	0.028	0.024
2004	94.5	1	**0.092**	0.057	0.051	0.042	0.036	0.029	0.024
2005	97.5	0	0.069	0.062	0.051	0.043	0.038	0.030	0.026
2006	92.9	3	**0.105**	0.075	0.065	0.054	0.043	0.031	0.025

Exceedences shown in bold.

Table 44: Percentiles of daily maximum four-hour ozone at Footscray (1997–2006)

AAQ NEPM standard: 0.08 ppm (4-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	98.1	3	**0.095**	0.072	0.063	0.049	0.038	0.028	0.024
1998	94.2	1	**0.089**	0.055	0.051	0.041	0.035	0.027	0.022
1999	95.9	0	0.069	0.063	0.057	0.048	0.037	0.030	0.024
2000	87.7	0	0.055	0.052	0.047	0.043	0.035	0.026	0.021
2001	*34.5*	*0*	*0.042*	*0.042*	*0.040*	*0.035*	*0.034*	*0.028*	*0.025*
2002	96.7	0	0.080	0.051	0.046	0.038	0.034	0.027	0.023
2003	97.8	2	**0.094**	0.063	0.056	0.045	0.038	0.026	0.021
2004	94.8	1	**0.083**	0.051	0.045	0.039	0.034	0.027	0.022
2005	98.9	0	0.066	0.053	0.047	0.042	0.035	0.030	0.025
2006	91.2	3	**0.103**	0.070	0.059	0.047	0.040	0.028	0.023

Years with data availability below 75per cent shown in italics. Exceedences shown in bold.

Table 45: Percentiles of daily maximum four-hour ozone at Geelong South (1998–2006)

AAQ NEPM standard: 0.08 ppm (4-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1998	95.1	0	0.076	0.048	0.042	0.033	0.029	0.026	0.022
1999	95.6	0	0.063	0.048	0.044	0.038	0.031	0.026	0.021
2000	89.0	0	0.057	0.052	0.045	0.035	0.030	0.020	0.016
2001	92.3	0	0.075	0.057	0.054	0.038	0.030	0.023	0.019
2002	89.3	0	0.053	0.048	0.046	0.038	0.031	0.024	0.020
2003	97.0	0	0.072	0.059	0.054	0.040	0.029	0.022	0.019
2004	91.3	1	**0.085**	0.054	0.052	0.041	0.034	0.028	0.023
2005	97.3	0	0.068	0.055	0.049	0.042	0.037	0.030	0.026
2006	94.2	2	**0.142**	0.070	0.059	0.047	0.038	0.030	0.025

Exceedences shown in bold.

Table 46: Percentiles of daily maximum four-hour ozone at Point Cook (1997–2006)

AAQ NEPM standard: 0.08 ppm (4-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	86.8	2	**0.113**	0.073	0.057	0.044	0.034	0.028	0.024
1998	94.8	3	**0.090**	0.075	0.061	0.039	0.032	0.024	0.020
1999	91.2	0	0.069	0.065	0.060	0.047	0.035	0.026	0.022
2000	85.5	0	0.067	0.060	0.058	0.046	0.037	0.030	0.027
2001	91.0	1	**0.095**	0.063	0.057	0.048	0.040	0.029	0.024
2002	96.4	0	0.070	0.062	0.056	0.044	0.036	0.029	0.025
2003	96.2	1	**0.093**	0.072	0.063	0.048	0.038	0.029	0.024
2004	98.6	1	**0.082**	0.058	0.051	0.044	0.036	0.027	0.024
2005	96.7	1	**0.082**	0.062	0.050	0.043	0.037	0.030	0.026
2006	84.9	1	**0.089**	0.061	0.057	0.046	0.036	0.027	0.025

Exceedences shown in bold.

Table 47: Percentiles of daily maximum four-hour ozone at Traralgon (1997–2006)

AAQ NEPM standard: 0.08 ppm (4-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	*60.5*	*0*	*0.064*	*0.055*	*0.051*	*0.045*	*0.039*	*0.029*	*0.024*
1998	92.1	0	0.058	0.053	0.048	0.041	0.035	0.029	0.024
1999	*31.8*	*0*	*0.053*	*0.051*	*0.044*	*0.040*	*0.033*	*0.026*	*0.021*
2000	96.7	0	0.050	0.046	0.043	0.034	0.031	0.026	0.021
2001	97.3	0	0.052	0.047	0.045	0.037	0.031	0.026	0.022
2002	100.0	0	0.049	0.046	0.038	0.034	0.031	0.027	0.022
2003	97.3	0	0.067	0.056	0.052	0.046	0.035	0.027	0.023
2004	97.3	0	0.050	0.044	0.043	0.039	0.034	0.029	0.023
2005	86.1	0	0.055	0.046	0.039	0.035	0.033	0.029	0.024
2006	100.0	2	**0.123**	0.072	0.067	0.046	0.041	0.031	0.026

Years with data availability below 75 per cent shown in italics. Exceedences shown in bold.

Sulfur Dioxide

Table 48: 2006 percentiles of daily peak one-hour sulfur dioxide concentrations in Victoria

AAQ NEPM standard: 0.20 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	90.7	0.013	0.011	0.009	0.008	0.006	0.004	0.002
Altona North	92.3	0.053	0.039	0.031	0.024	0.020	0.011	0.005
Geelong South	93.2	0.036	0.029	0.026	0.017	0.013	0.007	0.003
RMIT (CBD)	76.2	0.034	0.020	0.017	0.014	0.011	0.007	0.003
Latrobe Valley								
Moe	88.5	0.046	0.028	0.024	0.017	0.012	0.005	0.002
Traralgon	97.5	0.095	0.037	0.033	0.022	0.017	0.010	0.006

Table 49: 2006 percentiles of daily sulfur dioxide concentrations in Victoria

AAQ NEPM standard: 0.08 ppm (24-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	90.7	0.004	0.003	0.003	0.002	0.002	0.001	0.001
Altona North	92.3	0.019	0.009	0.006	0.004	0.003	0.002	0.001
Geelong South	93.2	0.005	0.005	0.004	0.003	0.002	0.001	0.001
RMIT (CBD)	76.2	0.008	0.005	0.004	0.003	0.003	0.002	0.001
Latrobe Valley								
Moe	88.5	0.009	0.007	0.005	0.004	0.003	0.002	0.001
Traralgon	97.5	0.023	0.007	0.006	0.005	0.004	0.003	0.002

Table 50: Percentiles of daily maximum one-hour sulfur dioxide at Alphington (1997–2006)

AAQ NEPM standard: 0.20 ppm (1-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1997	94.2	0	0.012	0.010	0.008	0.006	0.004	0.003	0.001
1998	97.0	0	0.015	0.012	0.008	0.007	0.005	0.003	0.002
1999	97.8	0	0.012	0.007	0.006	0.005	0.003	0.002	0.001
2000	97.8	0	0.010	0.007	0.006	0.004	0.003	0.001	0.000
2001	93.4	0	0.009	0.008	0.007	0.006	0.004	0.002	0.000
2002	98.4	0	0.012	0.008	0.007	0.006	0.004	0.002	0.000
2003	96.7	0	0.009	0.007	0.006	0.004	0.003	0.002	0.001
2004	99.7	0	0.014	0.009	0.007	0.005	0.004	0.003	0.001
2005	94.5	0	0.011	0.008	0.007	0.005	0.004	0.002	0.001
2006	90.7	0	0.013	0.011	0.009	0.008	0.006	0.004	0.002

Table 51: Percentiles of daily maximum one-hour sulfur dioxide at Geelong South (1998–2006)

AAQ NEPM standard: 0.20 ppm (1-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1998	*68.8*	*0*	*0.038*	*0.023*	*0.021*	*0.016*	*0.012*	*0.008*	*0.003*
1999	94.0	0	0.029	0.020	0.019	0.015	0.011	0.007	0.003
2000	88.2	0	0.029	0.019	0.014	0.010	0.007	0.004	0.001
2001	*50.7*	*0*	*0.037*	*0.024*	*0.023*	*0.018*	*0.012*	*0.006*	*0.002*
2002	84.9	0	0.040	0.029	0.024	0.016	0.012	0.005	0.001
2003	96.2	0	0.039	0.032	0.026	0.015	0.011	0.005	0.001
2004	90.7	0	0.069	0.026	0.023	0.019	0.013	0.007	0.003
2005	96.4	0	0.054	0.029	0.022	0.017	0.012	0.008	0.003
2006	93.2	0	0.036	0.029	0.026	0.017	0.013	0.007	0.003

Years with data availability below 75 per cent shown in italics.

Table 52: Percentiles of daily maximum one-hour sulfur dioxide at Traralgon (1997–2006)

AAQ NEPM standard: 0.20 ppm (1-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	*67.1*	*0*	*0.116*	*0.025*	*0.021*	*0.014*	*0.011*	*0.007*	*0.004*
1998	84.1	0	0.055	0.022	0.020	0.016	0.013	0.009	0.006
1999	80.3	0	0.032	0.020	0.017	0.013	0.012	0.007	0.004
2000	90.4	0	0.061	0.038	0.024	0.018	0.013	0.008	0.004
2001	98.6	0	0.063	0.036	0.020	0.014	0.011	0.008	0.005
2002	96.7	0	0.062	0.032	0.022	0.016	0.012	0.008	0.005
2003	97.5	0	0.082	0.038	0.030	0.020	0.015	0.009	0.005
2004	98.4	0	0.079	0.042	0.030	0.018	0.013	0.008	0.005
2005	91.5	0	0.061	0.044	0.034	0.022	0.015	0.009	0.005
2006	96.7	0	0.095	0.037	0.033	0.022	0.017	0.010	0.006

Years with data availability below 75 per cent shown in italics.

Table 53: Percentiles of daily average sulfur dioxide at Alphington (1997–2006)

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	94.2	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000
1998	97.0	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000
1999	97.8	0	0.001	0.001	0.001	0.001	0.000	0.000	-0.001
2000	97.8	0	0.002	0.001	0.001	0.000	0.000	0.000	-0.001
2001	93.4	0	0.002	0.001	0.001	0.000	0.000	0.000	-0.001
2002	98.4	0	0.002	0.001	0.001	0.000	0.000	0.000	-0.001
2003	96.7	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2004	99.7	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000
2005	94.5	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000
2006	90.7	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001

Table 54: Percentiles of daily average sulfur dioxide at Geelong South (1998–2006)

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1998	*68.8*	*0*	*0.006*	*0.004*	*0.004*	*0.003*	*0.002*	*0.001*	*0.001*
1999	94.0	0	0.005	0.003	0.003	0.002	0.002	0.001	0.000
2000	88.2	0	0.006	0.003	0.002	0.002	0.001	0.001	0.000
2001	50.7	0	0.006	0.005	0.003	0.002	0.001	0.000	-0.001
2002	84.9	0	0.004	0.002	0.002	0.001	0.001	0.000	-0.001
2003	96.2	0	0.004	0.003	0.002	0.002	0.001	0.000	-0.001
2004	90.7	0	0.006	0.004	0.003	0.002	0.002	0.001	0.000
2005	96.4	0	0.008	0.005	0.004	0.003	0.002	0.001	0.001
2006	93.2	0	0.005	0.005	0.004	0.003	0.002	0.001	0.001

Years with data availability below 75 per cent shown in italics. Years with data availability below 15 per cent not shown.

Table 55: Percentiles of daily average sulfur dioxide at Traralgon (1997–2006)

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 1 day per year

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1997	*67.1*	*0*	*0.028*	*0.008*	*0.006*	*0.004*	*0.003*	*0.002*	*0.001*
1998	84.1	0	0.009	0.007	0.007	0.005	0.005	0.004	0.002
1999	80.3	0	0.006	0.005	0.004	0.004	0.003	0.003	0.001
2000	90.4	0	0.013	0.007	0.005	0.004	0.003	0.002	0.001
2001	98.6	0	0.008	0.006	0.005	0.004	0.003	0.002	0.002
2002	96.7	0	0.009	0.008	0.005	0.004	0.004	0.003	0.002
2003	97.5	0	0.008	0.006	0.005	0.005	0.004	0.002	0.001
2004	98.4	0	0.010	0.007	0.006	0.004	0.003	0.002	0.001
2005	91.5	0	0.012	0.007	0.005	0.004	0.003	0.002	0.001
2006	96.7	0	0.023	0.007	0.006	0.005	0.004	0.003	0.002

Years with data availability below 75 per cent shown in italics.

Particles as PM_{10}

Table 56: 2006 percentiles of daily PM_{10} concentrations in Victoria

AAQ NEPM standard: 50 μg/m3 (24-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 5 days per year

Region	Data availability	Max	Percentiles (μg/m³)					
Performance monitoring station	(% of days)	(μg/m³)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	87.1	**154.7**	**82.5**	**58.4**	40.0	31.3	23.9	18.4
Brighton	89.9	**109.1**	**78.0**	46.2	36.7	25.9	19.8	13.8
Dandenong	100.0	**149.2**	**90.9**	**71.3**	47.5	38.2	30.0	22.8
Footscray	90.1	**124.5**	**77.0**	**55.9**	41.0	35.5	25.8	19.5
Geelong South	91.0	**116.4**	**98.0**	**72.2**	49.1	38.0	26.9	19.6
Mooroolbark	97.3	**219.9**	**135.9**	**69.6**	46.1	39.2	29.1	21.3
Richmond	97.5	**140.0**	**78.6**	**53.5**	37.9	31.4	24.3	18.4
RMIT (CBD)	78.4	**58.0**[a]	43.4	41.7	36.9	30.1	23.6	18.0
Latrobe Valley								
Moe	87.9	**254.0**	**135.3**	**85.2**	42.3	28.7	21.6	16.0
Traralgon	99.7	**193.5**	**82.6**	**50.3**	32.4	27.3	22.1	17.5
Ballarat	*60.5*	*43.8*	*38.6*	*36.4*	*30.9*	*25.6*	*20.1*	*15.1*
Mildura	*46.6*	***227.9***	***79.4***	***69.8***	***58.7***	*42.8*	*31.2*	*22.7*
Warrnambool	*21.9*	***66.8***	***63.4***	***57.0***	*43.4*	*32.8*	*24.0*	*17.7*

Years with data availability below 75 per cent shown in italics. Exceedences shown in bold.
a: RMIT maximum recorded by high-volume sampler. All other data from TEOMs.

Table 57: Percentiles of 24-hour PM_{10} at Alphington (1997–2006)

AAQ NEPM standard: 50 μg/m3 (24-hour average)

AAQ NEPM 2008 Goal: Standard exceeded on no more than 5 days per year

Year	Data availability	No. of exceedences	Max	Percentiles (μg/m³)					
	(% of days)	(days)	(μg/m³)	99th	98th	95th	90th	75th	50th
1997	98.1	2	**68.6**	44.3	37.8	33.4	29.5	23.0	18.1
1998	90.1	1	**53.5**	46.0	42.1	36.6	31.8	24.4	18.5
1999	84.7	0	43.7	34.1	32.7	30.3	26.3	21.6	17.4
2000	95.1	2	**56.5**	43.6	34.8	31.6	26.8	21.4	16.8
2001	91.0	2	**72.6**	39.6	35.1	32.8	27.9	23.4	17.2
2002	97.5	1	**66.2**	35.9	34.5	30.4	27.9	22.4	17.2
2003	95.9	10	**181.7**	**80.9**	**56.4**	38.3	30.9	22.9	17.2
2004	97.0	1	**51.6**	45.2	36.8	30.9	27.6	22.0	16.5
2005	92.6	0	46.6	40.7	36.8	34.5	31.4	23.3	17.0
2006	87.1	8	**154.7**	**82.5**	**58.4**	40.0	31.3	23.9	18.4

Exceedences shown in bold.

Table 58: Percentiles of 24-hour PM_{10} at Footscray (1997–2006)

AAQ NEPM standard: 50 μg/m3 (24-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than 5 days per year

Year	Data availability (% of days)	No. of exceedences (days)	Max ($\mu g/m^3$)	Percentiles ($\mu g/m^3$)					
				99th	98th	95th	90th	75th	50th
1997	98.9	4	**65.5**	**50.1**	41.5	38.2	32.5	25.7	19.8
1998	94.8	4	**59.8**	**50.5**	43.9	41.4	34.7	26.9	19.8
1999	96.7	1	**50.7**	41.2	38.0	32.8	28.4	23.9	19.1
2000	89.0	2	**57.8**	43.6	40.7	36.6	30.0	23.9	17.6
2001	*40.5*	*0*	*38.9*	*33.7*	*28.4*	*26.3*	*23.5*	*18.2*	*15.1*
2002	98.4	2	**79.1**	42.9	38.7	32.2	28.3	22.1	17.5
2003	87.7	10	**314.5**	**89.1**	**66.0**	41.0	32.2	23.4	17.6
2004	93.2	3	**58.1**	48.4	40.4	33.5	29.1	22.3	16.1
2005	96.4	0	48.9	44.7	41.3	37.4	35.0	26.0	18.9
2006	90.1	11	**124.5**	**77.0**	**55.9**	41.0	35.5	25.8	19.5

Years with data availability below 75 per cent shown in italics. Exceedences shown in bold.

Particles as $PM_{2.5}$

Table 59: 2006 percentiles of Daily $PM_{2.5}$ Concentrations in Victoria

AAQ NEPM Advisory Reporting Standard: 25 μg/m3 (24-hour average)

Region Performance monitoring station	Data availability (% of days)	Max ($\mu g/m^3$)	Percentiles ($\mu g/m^3$)					
			99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	87.6	**52.3**	**35.9**	**30.0**	24.1	15.8	10.0	7.2
Footscray	66.1	**34.1**	**28.8**	21.1	15.6	13.7	8.8	5.7

Monitoring by reference method (one-day-in-three). Exceedences shown in bold.

Monitoring for the $PM_{2.5}$ Equivalence Program was conducted using TEOM instruments. Results are presented in Table 60.

Table 60: $PM_{2.5}$ Equivalence Program 2006 TEOM monitoring – Daily Concentrations in Victoria

Region Performance monitoring station	Data availability (% of days)	Max ($\mu g/m^3$)	Percentiles ($\mu g/m^3$)					
			99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	87.7	112.6	50.5	28.7	14.9	11.2	7.6	4.7
Footscray	91.8	95.7	44.0	23.2	15.6	11.3	6.8	4.3