ENVIRONMENT REPORT

AIR MONITORING REPORT 2008 – COMPLIANCE WITH THE NATIONAL ENVIRONMENT PROTECTION (AMBIENT AIR QUALITY) MEASURE

Publication 1282 June 2009

OVERVIEW

This report presents the results of air quality monitoring in Victoria and assesses them against the requirements of the *Ambient Air Quality National Environment Protection Measure*[1] (AAQ NEPM). EPA also produces an annual air quality summary and data tables on its website.[2]

The major impacts on Victoria's air quality in 2008 came from smoke from planned burning and dust storms. These non-urban events led to a relatively high number of days when the particles standards were not met.

Accumulation of combustion particles from urban sources in calm, highly stable air also resulted in days when the particle standards were not met. Under typical summer smog formation conditions, the four hour ozone standard was not met a one station in Melbourne on two days. At other times, Victoria's air was generally good.

The AAQ NEPM establishes:

- requirements for monitoring air quality
- air quality standards that 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.

Monitoring was performed in accordance with Victoria's monitoring plan,[3] AAQ NEPM Technical Papers and EPA's NATA accreditation. Data capture targets were achieved at all stations, except for ozone (O_3) at Melton, where sampling errors reduced the data capture to below 75 per cent in one quarter.

Monitoring in 2008 showed that the AAQ NEPM goals and standards were met for carbon monoxide (CO), nitrogen dioxide (NO_2) and sulfur dioxide (SO_2).

The goals for ozone (O_3) were met at all stations except at Point Cook, where the four-hour standard was exceeded on two days (under typical summer smog formation conditions), and at Melton, where there was insufficient data collected in one quarter to demonstrate compliance. There were no other exceedences of the four-hour ozone standard. The one-hour ozone standard was met at all stations.

The goal was not met for particles (as PM_{10}) at four of the nine stations. PM_{10} exceeded the standard at all stations, with three to ten exceedences at Port Phillip region stations and two to six exceedences in the Latrobe Valley. The causes included planned burning (on six days in April), dust storms or local dust (eight days) and poor dispersion in stable air (three days).

The 24-hour advisory reporting standard for particles (as $PM_{2.5}$) was exceeded at the two stations in the Port Phillip region on up to four days. Planned burning was identified as the likely cause on three of the days and urban sources on two days. The annual reporting standard for $PM_{2.5}$ was met at both stations.

1 *National Environment Protection Measure for Ambient Air Quality*, National Environment Protection Council publication, available from www.ephc.gov.au.
2 *www.epa.vic.gov.au/air/monitoring/air_monitoring_report_2008.asp*
3 *Ambient air quality NEPM monitoring plan Victoria* (EPA publication 763), available from www.epa.vic.gov.au, under 'Resources > Publications online'.

TABLE OF CONTENTS

A. MONITORING SUMMARY

Current performance monitoring stations

Victoria's AAQ NEPM air monitoring plan was approved by the National Environment Protection Council Ministers in February 2001. Data presented in this report has 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. Consistent with the monitoring plan:

- **Port Phillip** and **Latrobe Valley** regions have permanent performance monitoring stations
- campaign monitoring has been conducted in **Ballarat**, **Bendigo**, **Shepparton**, **Warrnambool**, and **Mildura**
- data from New South Wales monitoring at Albury has been used for **Wodonga**.

Stations at which monitoring was conducted in 2008 are shown in Figures 1 and 2.

The 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; and *population-average* sites.[4]

Description of exposed population

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

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)[a]	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)	I	Industrial
LI	Light industrial	Res	Residential
Rur	Rural	G	Generally representative upper bound
Pop	Population-average	*	Trend station
a	RMIT station closed in 2006. Alternatives will be considered as part of an overall review of Victoria's monitoring plan.		

4 National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 3, *Monitoring Strategy*, available from www.ephc.gov.au

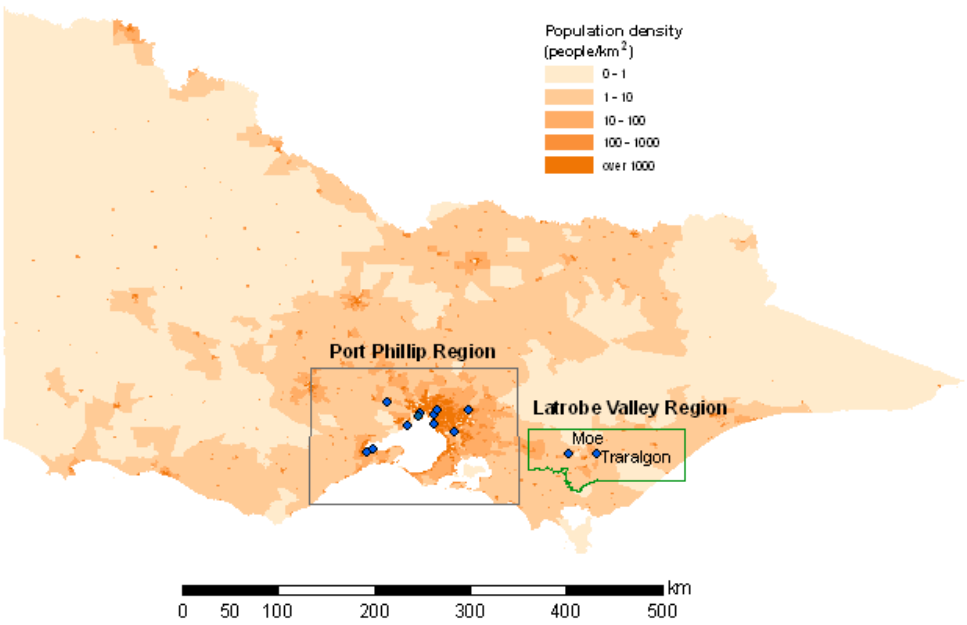

Figure 1: AAQ NEPM regions and population density in Victoria.

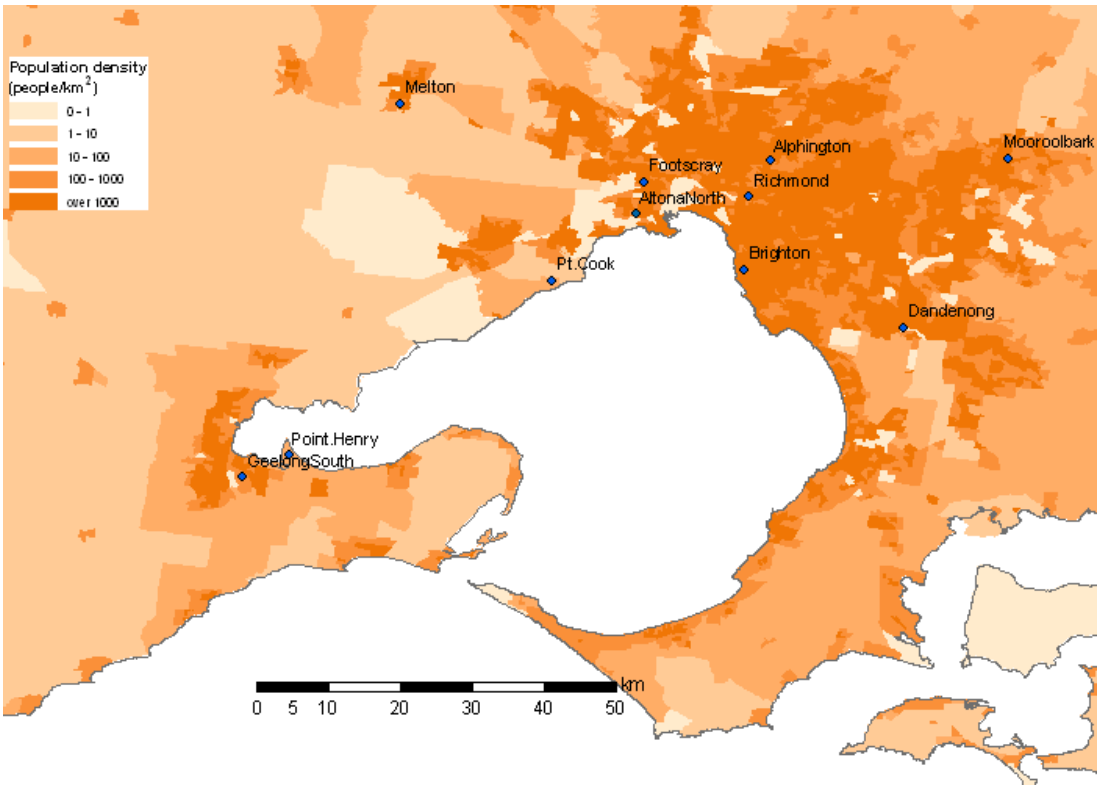

Figure 2: Monitoring stations and population density in Port Phillip region.

Table 2: Summary of stations' siting compliance with AS 3580.1.1-2007

Region Station	Location category	Height above ground	Minimum distance to support structure	Clear sky angle of 120˚	Unrestricted airflow of 270˚/360˚	20 m from trees	No boilers 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	☑	☑	☑	☑	☑	☑	☑
Mooroolbark	Res	☑	☑	☑	☑	☑	☑	☑
Point Cook	Rur/Res	☑	☑	☑	☑	☑	☑	☑
Point Henry	I/Rur	☑	☑	☑	☑	☑	☑	☑
Richmond	Res	☑	☑	☑	☑	☒	☑	☑
Latrobe Valley								
Moe	Res	☑	☑	☑	☑	☒	☑	☑
Traralgon	Res	☑	☑	☑	☑	☑	☑	☑

I Industrial LI Light industrial Res Residential Rur Rural

Implementation of the monitoring plan

Monitoring ceased at the CBD station (at RMIT University) in October 2006, when the lease was terminated due to building extensions.

A review of Victoria's air quality monitoring was conducted during 2008 and options for future monitoring are being considered.

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

The peak station for lead, in 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.[5]

Each of the monitoring stations meets the recommendations of the Australian standard for siting of sampling units as shown in Table 2. 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.

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 is identified as invalid and not included in reporting.

Particle concentration units of $\mu g/m^3$ refer to volumes at 0 ˚C and one atmosphere.

TEOM PM_{10} data included in this report has been adjusted according to the approved procedure,[6] 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.

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

6 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 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	AS3580.4.1-2008	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).
	$PM_{2.5}$	AS/NZS3580.9.10-2006[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 monitoring stations operated by EPA are covered by its NATA accreditation (Number 15119). EPA was successfully reaccredited in 2008.

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

Screening

The monitoring plan outlines processes to demonstrate whether levels of pollutants are consistently below the standards. Monitoring is not required, or may be at fewer than the specified number of stations, if screening procedures are satisfied.[7] Screening procedures as indicated in Table 4 have been satisfied for Victorian regions.

Details of screening arguments are given in the monitoring plan and previous annual reports.

Regional campaign monitoring has recorded elevated concentrations of PM_{10} that do not meet screening criteria. This issue will be considered further in the current review of monitoring.

Table 4: Screening procedures satisfied

Region	CO	NO_2	O_3	SO_2	PM_{10}	Pb
Port Phillip	B	–	–	B	–	B
Latrobe Valley	A	–	–	–	–	A
Ballarat	A	A	–	F	–	F
Bendigo	A	A	E&F	F	–	F
Mildura	F	F	E&F	F	–	F
Shepparton	F	F	E&F	F	–	F
Warrnambool	F	F	E	F	–	F
Wodonga	F	F	E&F	F	–	F

$PM_{2.5}$ 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).

Victoria also participates in the $PM_{2.5}$ Equivalence Program, with TEOM monitors located at Alphington and Footscray. Alphington was substituted for Mooroolbark, which was originally proposed in Schedule 5 of 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.[8]

7 National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, *Screening Procedures* (Revision 1, 2007), available from www.ephc.gov.au.

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

B. ASSESSMENT OF COMPLIANCE WITH STANDARDS AND GOAL

Air quality is assessed against the AAQ NEPM standards and goal 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 within ten years from commencement (that is, by 2008) as assessed in accordance with the monitoring protocol 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 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.

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

The AAQ NEPM also specifies advisory reporting standards for $PM_{2.5}$, with a daily (25 $\mu g/m^3$) and annual (8 $\mu g/m^3$) 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 max. 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 $\mu g/m^3$	5 days a year
Lead	1 year	0.50 $\mu g/m^3$	none
Particles as $PM_{2.5}$	1 day 1 year	25 $\mu g/m^3$ 8 $\mu g/m^3$	Not applicable Not applicable

The following tables summarise compliance with the standards and goal of the AAQ NEPM.

Air quality 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.

Air quality is assessed as 'not demonstrated' if there has been insufficient data collected to demonstrate that the standards and goal have been met or not met.

Regions may also be assessed as 'not demonstrated' if screening has not been completed. Performance against all standards is assessed as 'not demonstrated' at RMIT, where there was no monitoring during 2008.

Carbon monoxide

Table 6: 2008 compliance summary for carbon monoxide in Victoria

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

AAQ NEPM 2008 Goal: Standard exceeded on no more than one 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	94.6	92.2	94.8	94.4	94.0	0	met
Geelong South	93.7	94.3	81.8	93.7	90.9	0	met
Richmond	95.0	89.0	94.7	92.0	92.7	0	met

Regions that 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.

At stations operated during 2008, the carbon monoxide standard was not exceeded and compliance was demonstrated at all stations.

Nitrogen dioxide

Table 7: 2008 compliance summary for nitrogen dioxide in Victoria

AAQ NEPM standards: 0.12 ppm (one-hour average); 0.03 ppm (1-year average)

AAQ NEPM 2008 Goal: one-hour standard exceeded on no more than one 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	94.6	91.0	93.8	94.4	93.5	0	0.011	met	met
Brighton	95.1	95.1	91.8	94.8	94.2	0	0.010	met	met
Footscray	95.0	94.6	94.7	94.5	94.7	0	0.012	met	met
Geelong South	94.8	94.7	94.7	94.2	94.6	0	0.006	met	met
Point Cook	94.8	93.5	95.2	94.1	94.4	0	0.006	met	met
Latrobe Valley									
Moe	95.1	95.5	95.2	95.6	95.3	0	0.006	met	met
Traralgon	95.5	95.4	94.7	95.6	95.3	0	0.007	met	met

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.

At stations operated during 2008, the nitrogen dioxide standards were not exceeded and compliance was demonstrated at all stations.

Ozone

Table 8: 2008 compliance summary for ozone in Victoria

AAQ NEPM standards: 0.10 ppm (one-hour average); 0.08 ppm (four-hour average)
AAQ NEPM 2008 Goal: Standards exceeded on no more than one 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	94.6	87.7	94.5	94.4	92.8	0	0	Met	Met
Brighton	95.1	95.1	94.9	92.0	94.3	0	0	Met	Met
Dandenong	94.7	94.9	94.9	95.2	94.9	0	0	Met	Met
Footscray	94.8	94.6	91.0	93.9	93.6	0	0	Met	Met
Geelong South	94.8	94.7	92.8	94.2	94.1	0	0	Met	Met
Melton	65.2	92.8	95.0	94.7	87.0	0	0	ND	ND
Mooroolbark	92.7	95.2	94.6	93.6	94.0	0	0	Met	Met
Point Cook	94.7	93.6	95.2	94.2	94.4	0	2	Met	Not Met
Point Henry	91.5	95.7	95.5	95.6	94.6	0	0	Met	Met
Latrobe Valley									
Moe	95.6	95.6	95.2	95.5	95.5	0	0	Met	Met
Traralgon	95.6	95.6	95.5	94.8	95.4	0	0	Met	Met

ND: Not demonstrated by monitoring. See comments below.

Regions that 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: Bendigo, Shepparton, Warrnambool, Wodonga, Mildura.

During 2008, the four-hour ozone standard was exceeded on two days at Point Cook. Each of the recorded exceedences occurred on typical days conducive to formation of photochemical oxidants from urban sources.

The 2008 goal for the one and four-hour levels was met at all other stations with adequate data capture. Compliance was not demonstrated (ND) at Melton, due to data loss resulting from sampling errors.

Sulfur dioxide

Table 9: 2008 compliance summary for sulfur dioxide in Victoria

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

Region Performance monitoring station	Data availability rates (% of hours)					Exceedences (days)		Annual mean (ppm)	Performance against the standards and goal		
	Q1	Q2	Q3	Q4	Annual	1-hour	24-hour		1-hour	24-hour	1-year
Port Phillip											
Alphington	90.6	90.0	90.4	86.8	89.4	0	0	0.001	Met	Met	Met
Altona North	90.2	90.0	90.1	89.0	89.8	0	0	0.002	Met	Met	Met
Geelong South	91.3	88.2	88.2	93.8	90.4	0	0	0.001	Met	Met	Met
Latrobe Valley											
Moe	95.1	95.6	94.0	95.6	95.0	0	0	0.001	Met	Met	Met
Traralgon	95.5	95.4	88.7	95.5	93.8	0	0	0.002	Met	Met	Met

Regions that 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.

At stations operated during 2008, the sulfur dioxide standards were not exceeded and compliance was demonstrated at all stations. Annual mean values are close to the limits of detection.

Particles as PM_{10}

Table 10: 2008 compliance summary for PM_{10} in Victoria

AAQ NEPM Standard: 50 $\mu g/m^3$ (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)					Number of exceedences (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Port Phillip							
Alphington	100.0	98.9	98.9	100.0	99.5	3	Met
Brighton	100.0	100.0	100.0	100.0	100.0	5	Met
Dandenong	96.7	100.0	100.0	100.0	99.2	8	Not Met
Footscray	100.0	100.0	100.0	100.0	100.0	4	Met
Geelong South	100.0	100.0	100.0	98.9	99.7	6	Not met
Mooroolbark	91.2	100.0	100.0	100.0	97.8	10	Not met
Richmond	100.0	93.4	100.0	96.7	97.5	5	Met
Latrobe Valley							
Moe	100.0	95.6	100.0	100.0	98.9	6	Not met
Traralgon	100.0	100.0	100.0	100.0	100.0	2	Met

Monitoring was by TEOM.

Screening arguments that PM_{10} levels are reasonably expected to be consistently below the relevant AAQ NEPM standard have not been satisfied for other regions (i.e., Ballarat, Bendigo, Shepparton, Wodonga and Mildura). These are assessed as 'not demonstrated'.

The PM_{10} standard was exceeded at all stations and the 2008 NEPM goal was not met at Dandenong, Geelong South, Mooroolbark and Moe. These exceedences were the result of windborne dust, planned burning and urban sources, as detailed in Section C.

Particles as $PM_{2.5}$

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.

Table 11: 2008 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 (μg/m³)**
	Q1	Q2	Q3	Q4	Annual		
Port Phillip							
Alphington	100.0	100.0	100.0	100.0	100.0	4	7.8
Footscray	100.0	93.5	96.7	80.6	92.6	3	7.0

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

Exceedences of the 24-hour $PM_{2.5}$ reporting standard were caused by planned burning and the accumulation of urban emissions, as detailed in Section C.

Table 12 summarises Victoria's monitoring of $PM_{2.5}$ by TEOM for the Equivalence Program. TEOM $PM_{2.5}$ data is usually lower than the reference method, especially in the cooler months due to the loss of the volatile component of $PM_{2.5}$. Details are given in Section C.

Table 12: PM2.5 Equivalence Program 2008 TEOM monitoring summary

Region Performance monitoring station	**Data availability rates (% of days)**					**Annual mean**
	Q1	Q2	Q3	Q4	Annual	(μg/m³)
Port Phillip						
Alphington	100.0	98.9	98.9	100.0	99.5	5.8
Footscray	100.0	98.9	100.0	100.0	99.7	5.3

Monitoring by TEOM (daily).

Lead

Following the phasing out of leaded petrol, concentrations at the peak station, Collingwood, were below the level specified for discontinuing monitoring.[9] 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.

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

C. ANALYSIS OF AIR QUALITY MONITORING

Annual summary statistics 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.[10]

Carbon monoxide

Table 13: 2008 summary statistics for daily peak eight-hour carbon monoxide in Victoria

AAQ NEPM standard: 9.0 ppm (eight-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than one 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	360	3.2	May 24:02	3.1	Jun 03:02
Geelong South	346	2.2	Apr 25:02	2.0	May 25:03
Richmond	349	3.7	Jun 03:02	3.0	Jun 02:24

Carbon monoxide levels were well within the standard at all stations. The highest readings were at the inner-suburban site Richmond, where carbon monoxide reached 41 per cent of the standard.

Nitrogen dioxide

Table 14: 2008 summary statistics for daily peak one-hour nitrogen dioxide in Victoria

AAQ NEPM standard: 0.12 ppm (one-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than one 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	358	0.060	Apr 24:19	0.056	Nov 11:21
Brighton	362	0.053	Apr 24:20	0.051	Jul 29:11
Footscray	366	0.064	Mar 09:20	0.062	Apr 24:20
Geelong South	364	0.052	Apr 24:20	0.041	Jul 28:09
					May 29:20
Point Cook	365	0.065	Apr 24:13	0.048	May 22:13
Latrobe Valley					
Moe	365	0.046	Apr 24:18	0.031	Apr 11:19
Traralgon	364	0.039	Apr 11:17		
			Oct 12:21		

Nitrogen dioxide levels were well within the standard at all stations. The highest one-hour average occurred at Point Cook, and was 54 per cent of the hourly standard. The highest annual average occurred at Footscray, and was 40 per cent of the standard (Table 7).

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

Ozone

Table 15: 2008 summary statistics for daily peak one-hour ozone in Victoria

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than one 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	356	0.075	Mar 09:16	0.061	Jan 10:14
Brighton	362	0.090	Feb 04:15	0.077	Feb 17:15
Dandenong	366	0.074	Jan 10:15	0.069	Feb 17:15
	360	0.073	Jan 04:17	0.068	Feb 18:17
Footscray					Mar 09:15
Geelong South	361	0.084	Jan 10:17	0.079	Mar 13:17
Melton	330	0.071	Feb 18:18	0.067	Nov 12:18
Mooroolbark	361	0.081	Mar 15:17	0.072	Jan 10:15
Point Cook	365	0.088	Feb 17:16	0.087	Jan 10:16
Point Henry	361	0.080	Nov 12:15	0.079	Jan 10:14
Latrobe Valley					
Moe	366	0.057	Jan 10:16	0.056	Jan 01:16
Traralgon	366	0.061	Jan 05:15	0.060	Mar 17:18

Table 16: 2008 summary statistics for daily peak four-hour ozone in Victoria

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than one 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	356	0.063	Mar 09:17	0.061	Jan 10:16
Brighton	361	0.079	Feb 04:17	0.073	Feb 17:18
Dandenong	366	0.073	Jan 10:17	0.064	Jan 05:19
Footscray	359	0.064	Jan 04:19	0.063	Jan 10:15
Geelong South	359	0.076	Jan 10:19	0.072	Mar 13:20
Melton	330	0.062	Feb 18:20	0.057	Nov 12:20
Mooroolbark	361	0.073	Mar 15:18	0.069	Jan 10:17
Point Cook	365	**0.082**	Feb 17:18	**0.081**	Jan 10:18
Point Henry	361	0.073	Jan 10:17	0.072	Nov 12:17
Latrobe Valley					
Moe	366	0.057	Jan 10:18	0.052	Jan 01:18
Traralgon	366	0.053	Jan 26:16		
			Feb 19:16		

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.

One-hour average ozone remained below the standard at all stations. The highest reading, at Brighton, was 90 per cent of the standard. The four-hour standard was exceeded only at Point Cook, on the two days shown in Table 17.

Both days followed a typical pattern, in which air was transported over Port Phillip Bay on a hot day and returned over the Point Cook monitoring station after ozone had been formed by photochemical reactions.

Table 17: 2008 ozone exceedences

AAQ NEPM standards: 0.10ppm (one-hour average), 0.08ppm (four-hour average)
AAQ NEPM 2008 Goal: Standards exceeded on no more than one day per year

Date Averaging period	**Port Phillip** Point Cook	**Inferred cause**
10 Jan 08 4h ave	0.081	Urban
17 Feb 08 4h ave	0.082	Urban

All readings in ppm.

Sulfur dioxide

Table 18: 2008 summary statistics for daily peak one-hour sulfur dioxide in Victoria

AAQ NEPM standard: 0.20 ppm (one-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than one 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	360	0.014	Sep 03:17	0.012	Jun 20:10
Altona North	362	0.059	Sep 10:20	0.051	Nov 20:11
Geelong South	354	0.050	Feb 20:02	0.046	Jan 31:11
Latrobe Valley					
Moe	363	0.033	Jan 17:15	0.032	Nov 04:19
Traralgon	358	0.170	Nov 04:17	0.059	Jan 17:12

Table 19: 2008 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 one day per year

Region Performance monitoring station	**Number of valid days**	**Highest (ppm)**	**Highest (date)**	**2nd highest (ppm)**	**2nd highest (date)**
Port Phillip					
Alphington	360	0.005	Sep 03	0.003	Jun 20
					Jun 04
					May 13
Altona North	362	0.015	Nov 15	0.012	Dec 30
Geelong South	354	0.007	Jun 16		
			Mar 13		
Latrobe Valley					
Moe	363	0.007	Dec 20		
			Mar 02		
Traralgon	358	0.026	Nov 04	0.009	Dec 10

Sulfur dioxide levels were well within the standards at most stations. The daily peak sulfur dioxide level at Traralgon, whilst meeting the standard, reached a one-hour level of 0.170 ppm. This was the highest value ever recorded at Traralgon and was attributed to power station emissions being convectively mixed to ground level under unstable

conditions. Maximum one-hour averages are higher relative to the standard than 24-hour or annual averages. The highest readings occurred at Traralgon and were 85 per cent of the one-hour standard and 33 per cent of the 24-hour standard. Annual averages at all stations (Table 9) are close to the limit of detection.

Particles as PM_{10}

Table 20: 2008 summary statistics for 24-hour PM10 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	364	**71.1**	Apr 24	44.0	Mar 15
Brighton	366	**65.3**	Apr 24	49.8	Apr 23
Dandenong	363	**88.6**	Apr 24	**59.2**	Oct 30
Footscray	366	**89.3**	Apr 02	46.9	Jun 04
Geelong South	365	**168.7**	Apr 02	**62.2**	Nov 13
Mooroolbark	358	**99.9**	Apr 24	**58.3**	Mar 14
Richmond	357	**73.5**	Apr 24	48.9	Apr 19
Latrobe Valley					
Moe	362	**90.9**	Apr 02	**50.3**	Apr 11
Traralgon	366	**64.9**	Apr 25	39.9	Mar 15

In addition to TEOM monitoring, PM_{10} was monitored by high-volume sampler one day in six at Footscray, throughout the year. The highest high-volume sampler reading was 44.7 $\mu g/m^3$.

In 2008, PM_{10} exceedences occurred on the days listed in Table 21. The likely causes have been inferred, where possible, with the majority of exceedences attributed to windborne dust (during the warmer months) and planned burning (in April).

Widespread dust storms were recorded during the early part of the year, but exceedences due to dust in Spring were from local sources (including the Geelong Show on October 18).

Exceedences caused by the build-up of pollution in stable atmospheric conditions with low winds were limited to three days at Mooroolbark, where the station is located in a valley and is exposed to a variety of sources including planned burning, wood smoke and quarry dust.

Overall, there were 49 exceedences over 18 days in 2008. In comparison the standard was exceeded 58 times over 34 days in 2007.

Table 21: 2008 PM_{10} exceedences

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

Date	Port Phillip							Latrobe Valley		Inferred cause[a]
	Alphington	Brighton	Dandenong	Footscray	Geelong South	Mooroolbark	Richmond	Moe	Traralgon	
Jan 11				50.2	70.7					Dust
Mar 14	54.3	50.8	61.8	70.2	116.9	58.3	53.6	67.2	54.7	Dust
Mar 15			55.4			56.5				Dust
Mar 17						54.0				Urban
Apr 02		56.2	77.8	89.3	168.7		60.6	90.9		Dust
Apr 11								50.3		Unknown
Apr 19						68.3				Fire
Apr 20			54.0			59.9				Fire
Apr 21								58.6		Fire
Apr 23			61.0			61.6	52.9			Fire
Apr 24	71.1	65.3	88.6	64.2	69.5	99.9	73.5	73.3		Fire
Apr 25	64.3	55.8	66.2			92.0	60.1	68.4	64.9	Fire
Jun 02						52.8				Urban
Aug 23						54.8				Urban
Oct 18					65.1					Dust
Oct 29		58.8								Dust
Oct 30			59.2							Dust
Nov 13					62.2					Dust
Total	3	5	8	4	6	10	5	6	2	

All readings in μg/m³.

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

Particles as $PM_{2.5}$

Table 22: 2008 summary statistics for 24-hour $PM_{2.5}$ in Victoria

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

Region Performance monitoring station	Number of valid days	Highest (μg/m³)	Highest (date)
Port Phillip			
Alphington	122	**46.7**	Apr 25
Footscray	113	**30.5**	Apr 19

Monitoring by reference method (one day in three).

The 24-hour reporting standard for $PM_{2.5}$ was exceeded at both stations. Exceedences were caused by planned burning and the accumulation of urban emissions (Table 23).

The annual reporting standard was achieved at both stations (Table 11).

Table 23: 2008 $PM_{2.5}$ exceedences

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

Date	Port Phillip		Inferred cause[a]
	Alphington	Footscray	
Apr 19	35.1	30.5	Fire
Apr 25	46.7		Fire
May 13	32.2	25.5	Fire/Urban
Jun 03	32.1	29.7	Urban

All readings in μg/m³. Measured by reference method.

a Fire = smoke from bushfires or planned burning.
Urban = particles accumulating in stable atmospheric conditions, typically from vehicle traffic or domestic wood heaters.

Results of $PM_{2.5}$ monitoring by TEOM (Table 24) are not adjusted for loss of volatiles. The highest readings occurred on a day affected by planned burning, when the reference monitors were not scheduled to operate.

Table 24: $PM_{2.5}$ Equivalence Program 2008 TEOM monitoring – daily statistics

Region Performance monitoring station	Number of valid days	Highest (μg/m³)	Highest (date)
Port Phillip			
Alphington	364	44.2	Apr 24
Footscray	365	34.5	Apr 24

Summary of progress towards achieving the AAQ NEPM 2008 goal

Compliance in 2008

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 2008, at all stations where there was sufficient data capture to make the assessment, the 2008 goal was met, except for four-hour ozone at Point Cook, and PM_{10} at four of the nine stations.

Most of the PM_{10} exceedences were attributed to windborne dust and planned burning. Mooroolbark was the only station to experience PM_{10} exceedences due to the accumulation of urban pollution (on three days).

The four-hour ozone standard was exceeded at one station on two days with typical summer smog conditions.

The 24-hour advisory reporting standard for particles (as $PM_{2.5}$) was exceeded at the two stations in the Port Phillip region – four days at Alphington, three days at Footscray. The annual reporting standard was met for $PM_{2.5}$.

Trends in compliance

An analysis of Victoria's compliance with the NEPM has been performed taking into account monitoring over 2003-2008[11] and screening (as summarised in Table 4).

Over 2003-2008, the goal and standards have been consistently met in Victoria for carbon monoxide, nitrogen dioxide, sulfur dioxide and lead.

For ozone, the NEPM goal was met in three of the last six years in the Port Phillip region (2004, 2005 and 2007) and in five of the last six years in the Latrobe Valley region (2003, 2004, 2005, 2007, 2008).[12] Exceedences of both the four-hour and (less frequently) one-hour standards have been recorded. Major bushfires in 2003, 2006 and 2007 caused or exacerbated many of the ozone exceedences observed (see Figure 3).[13] Ozone monitoring in other rural regions did not record any exceedences and all except Ballarat satisfy screening criteria.

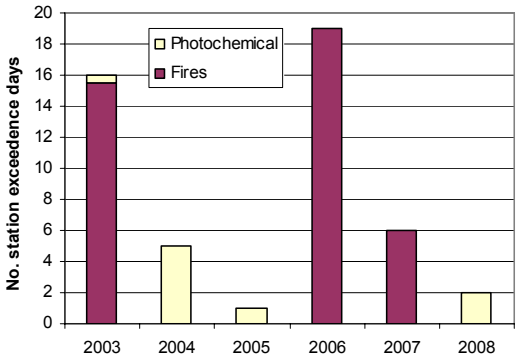

Figure 3: Inferred causes of exceedences of the ozone four-hour standard (Port Phillip region 2003-08)

In the Port Phillip region, the particles as PM_{10} goal has not been met over the period 2003-08. The exceedences were attributed (See Figure 4) to fires (bushfires or planned burning) as the most frequent cause, followed by windborne dust (either locally raised dust or dust storms with transport over larger distances). 2003 and 2006 were particularly affected by fires, with all stations in the Port Phillip region not meeting the goal. In other years, the majority of stations in the region met the goal.

11 Prior to 2003 Victoria's monitoring network was not fully established for ozone and particles.

12 A region achieves the goal in any year if all stations in the region achieve the goal.

13 The regional exceedences shown in Figures 3 to 5 are the sum of the exceedence days recorded at all stations in the region. This number cannot be compared with the AAQ NEPM goal.

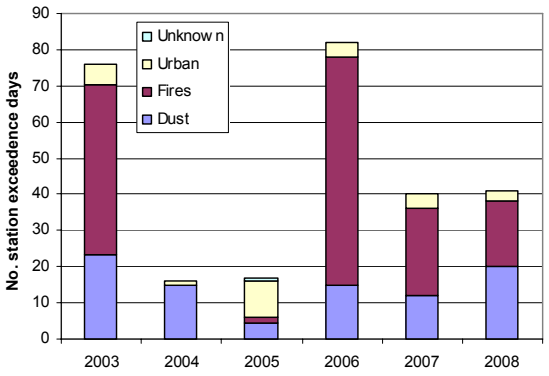

Figure 4: Inferred causes of exceedences of the PM_{10} standard (Port Phillip region 2003–08)

In the Latrobe Valley region, the particles as PM_{10} goal was met in two of the last six years (2004 and 2005). Bushfires were the major cause of exceedences observed. Planned burning, dust and urban sources also led to exceedences of the standard.

Campaign monitoring in other regions of Victoria (with the exception of Mildura) shows that the particles as PM_{10} goal is achieved although some exceedences occur. Monitoring at Mildura indicated that this region does not meet the goal due to frequent dust storms.

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 (Alphington and Footscray) in the Port Phillip region since 2002. Exceedences of the the 24-hour $PM_{2.5}$ standard have occurred at these stations (Figure 5), attributed to urban and bushfire sources.

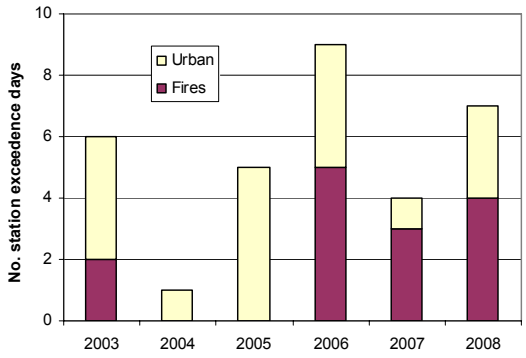

Figure 5: Inferred causes of exceedences of the $PM_{2.5}$ 24-hour standard (Port Phillip region 2003–08)

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.[14] In 2008 this requirement was achieved for all pollutants at all stations, except for ozone at Melton, where a sampling error caused loss of data in one quarter.

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. Screening has not demonstrated that PM_{10} levels are expected to be consistently below the standard in the six rural 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'.

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

D. TRENDS AND POLLUTANT DISTRIBUTIONS

Results of further analysis of the monitoring data are presented in this section. Percentiles of 2008 daily peak concentrations are presented for each station and standard. 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 in the year are omitted and stations with less than 75 per cent data are shown in italics. Exceedences are shown in bold. The percentiles for eight-hour carbon monoxide and four-hour ozone are based on running averages, including those that overlap from one day to the next.

Percentiles of the daily peak concentrations in Port Phillip Region, are plotted after 2001, when monitoring according to the NEPM protocol ensured greater continuity of stations operating each year. The values plotted are averages of the percentiles from stations having at least 75 per cent of data in the year. Different stations and different statistics can suggest different trend behaviour; no estimates of statistical significance are presented.

Annual statistics are also presented in tables for each station with at least five years of data. Trend data for lead is presented, although monitoring ceased in 2004.

Carbon monoxide

Table 25: 2008 percentiles of daily peak eight-hour carbon monoxide concentrations in Victoria

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

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

Region Performance monitoring station	Data availability (% of days)	Max (ppm)	Percentiles (ppm) 99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	98.4	3.2	2.7	2.3	1.7	1.4	0.8	0.4
Geelong South	94.5	2.2	1.8	1.6	1.0	0.5	0.3	0.2
Richmond	95.4	3.7	1.9	1.6	1.5	1.2	0.6	0.4

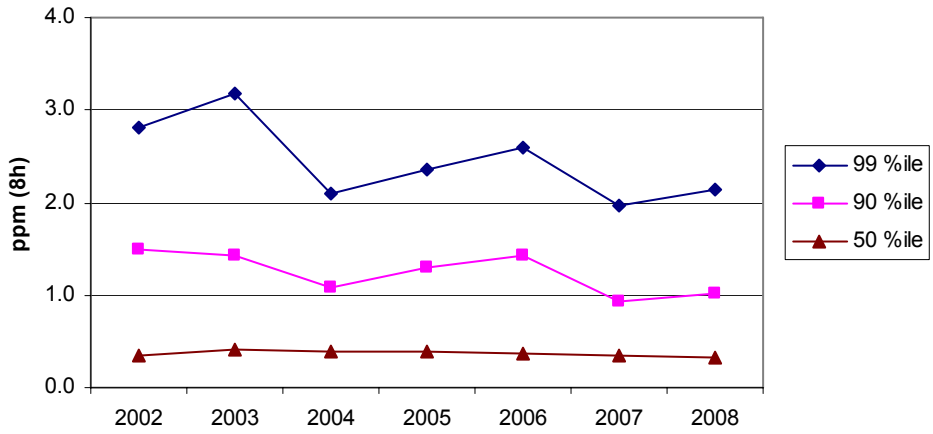

Figure 6: Percentiles of daily maximum eight-hour carbon monoxide (average of Port Phillip stations 2002-08)

In interpreting trends, it should be noted that monitoring at RMIT ceased in October 2006. This CBD station tended to record higher carbon monoxide, so averages in later years may be relatively lower.

Table 26: Percentiles of daily maximum eight-hour carbon monoxide at Alphington (1995–2008)

AAQ NEPM standard: 9.0 ppm (eight-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than one day per year

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	92.1	0	6.0	4.9	4.5	3.4	2.5	1.5	0.8
1996	98.6	0	6.5	5.8	5.0	3.3	2.5	1.6	0.8
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
2007	98.6	0	2.8	2.3	1.9	1.6	1.2	0.8	0.5
2008	98.4	0	3.2	2.7	2.3	1.7	1.4	0.8	0.4

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

Table 27: Percentiles of daily maximum eight-hour carbon monoxide at Geelong South (1995–2008)

AAQ NEPM standard: 9.0ppm (eight-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than one day per year

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	80.5	0	4.2	3.2	2.9	2.4	1.6	0.8	0.4
1996	86.3	0	4.3	3.3	2.9	1.9	1.2	0.5	0.3
1997	*0.0*								
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
2007	98.1	0	1.9	1.3	1.1	0.7	0.6	0.4	0.2
2008	94.5	0	2.2	1.8	1.6	1.0	0.5	0.3	0.2

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

Table 28: Percentiles of daily maximum eight-hour carbon monoxide at Richmond (2001–08)

AAQ NEPM standard: 9.0ppm (eight-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than one day per year

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
2001	89.3	0	4.0	3.4	3.1	2.7	2.0	1.1	0.5
2002	93.2	0	5.0	3.1	2.8	2.4	1.9	0.8	0.3
2003	96.4	0	6.4	4.0	3.6	2.6	1.7	0.8	0.3
2004	96.2	0	3.9	2.4	2.2	1.8	1.2	0.6	0.3
2005	96.2	0	3.8	3.1	2.8	2.2	1.5	0.6	0.2
2006	95.3	0	3.2	2.9	2.8	2.3	1.7	0.7	0.3
2007	97.3	0	2.9	2.3	1.9	1.5	1.0	0.5	0.3
2008	95.4	0	3.7	1.9	1.6	1.5	1.2	0.6	0.4

Table 29: Percentiles of daily maximum eight-hour carbon monoxide at RMIT (CBD) (1995–2006)

AAQ NEPM standard: 9.0ppm (eight-hour average)
AAQ NEPM 2008 Goal: Standard exceeded on no more than one day per year

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	*2.7*								
1996	90.4	0	5.5	4.5	3.8	2.8	2.2	1.6	0.9
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 30: 2008 percentiles of daily peak one-hour nitrogen dioxide concentrations in Victoria

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

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

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	97.8	0.060	0.043	0.039	0.035	0.032	0.028	0.022
Brighton	98.9	0.053	0.042	0.039	0.035	0.033	0.027	0.021
Footscray	100.0	0.064	0.048	0.045	0.038	0.034	0.029	0.022
Geelong South	99.5	0.052	0.039	0.033	0.029	0.027	0.021	0.015
Point Cook	99.7	0.065	0.037	0.035	0.032	0.028	0.020	0.013
Latrobe Valley								
Moe	99.7	0.046	0.028	0.026	0.023	0.021	0.017	0.013
Traralgon	99.5	0.039	0.033	0.029	0.026	0.024	0.020	0.014

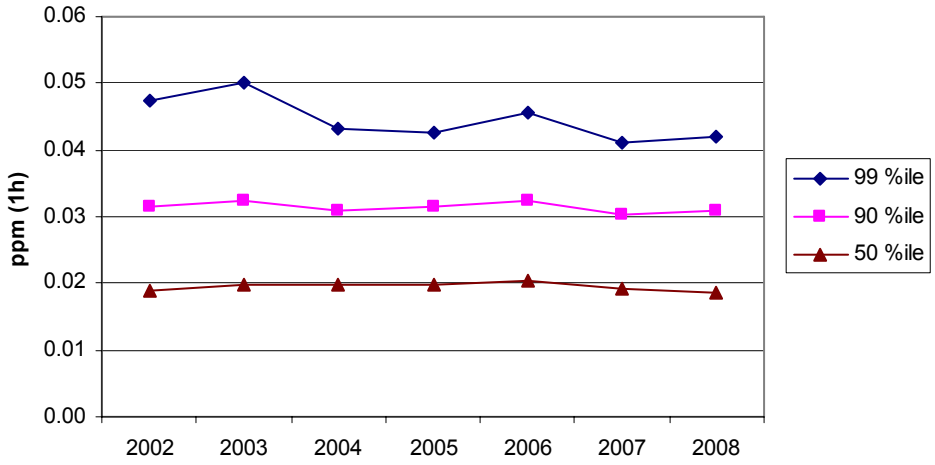

Figure 7: Percentiles of daily maximum one-hour nitrogen dioxide (average of Port Phillip stations 2002-08)

In interpreting trends, it should be noted that monitoring at RMIT ceased in October 2006. This CBD station tended to record higher nitrogen dioxide, so averages in later years may be relatively lower.

Table 31: Percentiles of daily maximum one-hour nitrogen dioxide at Alphington (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	*72.6*	*0*	*0.051*	*0.046*	*0.043*	*0.039*	*0.035*	*0.030*	*0.025*
1996	93.7	0	0.061	0.046	0.043	0.038	0.034	0.029	0.024
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
2007	100.0	0	0.052	0.046	0.039	0.035	0.033	0.029	0.024
2008	97.8	0	0.060	0.043	0.039	0.035	0.032	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 Brighton (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	85.2	0	0.060	0.049	0.042	0.038	0.034	0.028	0.022
1996	82.8	0	0.056	0.044	0.044	0.038	0.034	0.028	0.022
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
2007	99.7	0	0.048	0.040	0.038	0.034	0.032	0.026	0.020
2008	98.9	0	0.053	0.042	0.039	0.035	0.033	0.027	0.021

Table 33: Percentiles of daily maximum one-hour nitrogen dioxide at Footscray (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	87.1	0	0.056	0.051	0.048	0.043	0.038	0.031	0.024
1996	91.5	0	0.071	0.054	0.049	0.043	0.037	0.028	0.023
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
2007	99.7	0	0.056	0.050	0.045	0.038	0.035	0.030	0.025
2008	100.0	0	0.064	0.048	0.045	0.038	0.034	0.029	0.022

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

Table 34: Percentiles of daily maximum one-hour nitrogen dioxide at Geelong South (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	*68.8*	*0*	*0.048*	*0.039*	*0.038*	*0.034*	*0.031*	*0.025*	*0.021*
1996	86.6	0	0.044	0.041	0.038	0.033	0.028	0.024	0.018
1997	*0*								
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
2007	99.7	0	0.037	0.032	0.030	0.028	0.026	0.022	0.015
2008	99.5	0	0.052	0.039	0.033	0.029	0.027	0.021	0.015

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

Table 35: Percentiles of daily maximum one-hour nitrogen dioxide at Point Cook (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	83.6	0	0.048	0.041	0.038	0.032	0.028	0.020	0.014
1996	91.5	0	0.054	0.046	0.045	0.038	0.029	0.023	0.015
1997	*0*								
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
2007	97.0	0	0.046	0.038	0.034	0.029	0.025	0.020	0.013
2008	99.7	0	0.065	0.037	0.035	0.032	0.028	0.020	0.013

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

Table 36: Percentiles of daily maximum one-hour nitrogen dioxide at RMIT (CBD) (1996–2006)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1996	92.1	0	0.085	0.059	0.052	0.045	0.040	0.032	0.027
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 37: Percentiles of daily maximum one-hour nitrogen dioxide at Moe (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	*74.8*	*0*	*0.031*	*0.028*	*0.026*	*0.024*	*0.022*	*0.018*	*0.014*
1996	*26.8*	*0*	*0.027*	*0.021*	*0.018*	*0.016*	*0.013*	*0.012*	*0.009*
1997	*69.6*	*0*	*0.036*	*0.031*	*0.031*	*0.026*	*0.023*	*0.020*	*0.016*
1998	87.9	0	0.049	0.036	0.033	0.029	0.026	0.022	0.016
1999	86.0	0	0.049	0.035	0.032	0.028	0.025	0.022	0.017
2000	*73.5*	*0*	*0.050*	*0.040*	*0.036*	*0.027*	*0.024*	*0.020*	*0.015*
2001	95.1	0	0.036	0.028	0.026	0.024	0.022	0.018	0.014
2002	96.7	0	0.036	0.030	0.029	0.027	0.026	0.021	0.014
2003	98.4	0	0.034	0.031	0.029	0.027	0.024	0.020	0.014
2004	100.0	0	0.032	0.026	0.024	0.023	0.021	0.018	0.014
2005	99.5	0	0.039	0.034	0.032	0.027	0.024	0.019	0.014
2006	81.1	0	0.058	0.030	0.029	0.026	0.024	0.020	0.016
2007	98.4	0	0.032	0.028	0.027	0.024	0.022	0.019	0.014
2008	99.7	0	0.046	0.028	0.026	0.023	0.021	0.017	0.013

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

Table 38: Percentiles of daily maximum one-hour nitrogen dioxide at Traralgon (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	94.0	0	0.040	0.029	0.028	0.027	0.024	0.021	0.016
1996	85.8	0	0.035	0.032	0.029	0.027	0.025	0.022	0.016
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
2007	97.5	0	0.032	0.029	0.027	0.026	0.024	0.019	0.015
2008	99.5	0	0.039	0.033	0.029	0.026	0.024	0.020	0.014

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

Ozone

Table 39: 2008 percentiles of daily peak one-hour ozone concentrations in Victoria

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

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

Region	**Data availability**	**Max**	**Percentiles (ppm)**					
Performance monitoring station	**(% of days)**	**(ppm)**	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	97.3	0.075	0.056	0.051	0.044	0.037	0.028	0.023
Brighton	98.9	0.090	0.073	0.071	0.050	0.044	0.034	0.029
Dandenong	100.0	0.074	0.063	0.056	0.048	0.041	0.031	0.027
Footscray	98.4	0.073	0.065	0.055	0.048	0.041	0.032	0.026
GeelongSouth	98.6	0.084	0.073	0.063	0.047	0.038	0.032	0.029
Melton	90.2	0.067	0.056	0.052	0.047	0.041	0.033	0.030
Mooroolbark	98.6	0.081	0.064	0.057	0.051	0.045	0.034	0.027
Point Cook	99.7	0.088	0.081	0.065	0.049	0.043	0.035	0.031
Point Henry	98.6	0.080	0.064	0.057	0.043	0.036	0.030	0.027
Latrobe Valley								
Moe	100.0	0.057	0.052	0.047	0.038	0.031	0.024	0.021
Traralgon	100.0	0.061	0.055	0.048	0.038	0.032	0.026	0.023

Table 40: 2008 percentiles of daily peak four-hour ozone concentrations in Victoria

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

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

Region	**Data availability**	**Max**	**Percentiles (ppm)**					
Performance monitoring station	**(% of days)**	**(ppm)**	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	97.3	0.063	0.050	0.047	0.038	0.035	0.027	0.022
Brighton	98.6	0.079	0.068	0.066	0.047	0.041	0.033	0.028
Dandenong	100.0	0.073	0.058	0.053	0.044	0.040	0.030	0.025
Footscray	98.1	0.064	0.059	0.053	0.042	0.039	0.030	0.025
GeelongSouth	98.1	0.076	0.067	0.060	0.045	0.038	0.031	0.028
Melton	90.2	0.057	0.052	0.048	0.045	0.039	0.032	0.029
Mooroolbark	98.6	0.073	0.057	0.053	0.047	0.041	0.032	0.027
Point Cook	99.7	**0.082**	0.074	0.061	0.045	0.040	0.034	0.030
Point Henry	98.6	0.073	0.058	0.050	0.041	0.035	0.029	0.026
Latrobe Valley								
Moe	100.0	0.057	0.048	0.043	0.036	0.029	0.023	0.020
Traralgon	100.0	0.053	0.050	0.042	0.036	0.030	0.025	0.022

Exceedences shown in bold.

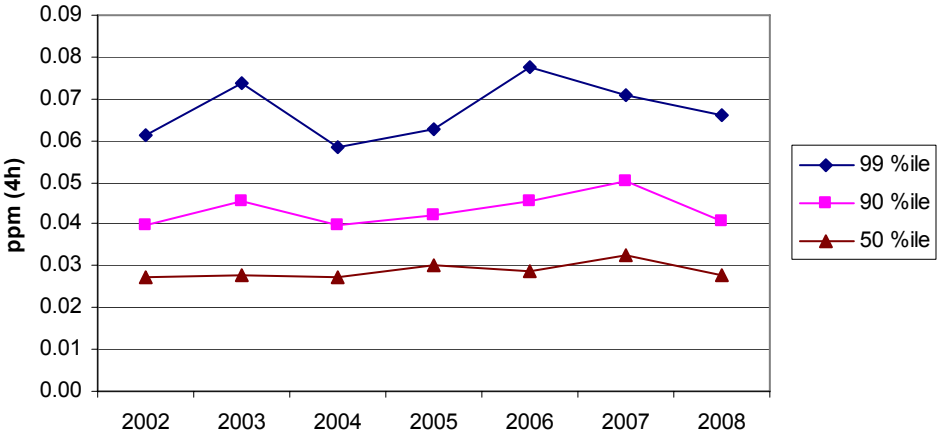

Figure 8: Percentiles of daily maximum one-hour ozone (average of Port Phillip stations 2002-08)

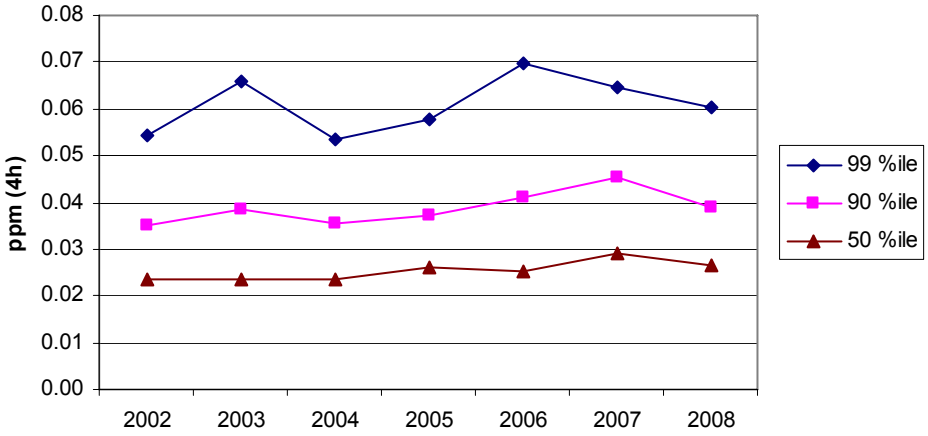

Figure 9: Percentiles of daily maximum four-hour ozone (average of Port Phillip stations 2002-08)

Table 41: Percentiles of daily maximum one-hour ozone at Alphington (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	95.9	0	0.089	0.057	0.050	0.041	0.034	0.027	0.022
1996	97.3	0	0.076	0.062	0.060	0.044	0.038	0.026	0.021
1997	91.2	0	0.099	0.076	0.069	0.050	0.036	0.026	0.020
1998	96.2	0	0.088	0.061	0.056	0.044	0.035	0.023	0.018
1999	97.8	0	0.074	0.063	0.057	0.047	0.035	0.026	0.020
2000	98.1	0	0.067	0.055	0.049	0.045	0.034	0.024	0.020
2001	92.1	0	0.077	0.054	0.051	0.042	0.036	0.026	0.021
2002	89.6	0	0.051	0.048	0.046	0.040	0.036	0.027	0.023
2003	96.4	1	**0.102**	0.064	0.059	0.050	0.041	0.030	0.025
2004	96.7	0	0.073	0.048	0.046	0.040	0.037	0.028	0.023
2005	92.9	0	0.077	0.058	0.051	0.045	0.039	0.031	0.026
2006	90.1	3	**0.127**	0.084	0.068	0.059	0.048	0.033	0.026
2007	98.9	1	**0.121**	0.072	0.067	0.060	0.048	0.034	0.029
2008	97.3	0	0.075	0.056	0.051	0.044	0.037	0.028	0.023

Exceedences shown in bold.

Table 42: Percentiles of daily maximum one-hour ozone at Brighton (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	95.1	1	**0.108**	0.078	0.071	0.047	0.039	0.030	0.025
1996	95.6	0	0.089	0.077	0.062	0.049	0.039	0.029	0.024
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
2007	99.7	1	**0.122**	0.076	0.069	0.060	0.053	0.039	0.032
2008	98.9	0	0.090	0.073	0.071	0.050	0.044	0.034	0.029

Exceedences shown in bold.

Table 43: Percentiles of daily maximum one-hour ozone at Dandenong (1995–2008)

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	97.0	0	0.098	0.057	0.052	0.043	0.036	0.029	0.025
1996	94.0	0	0.075	0.063	0.055	0.047	0.038	0.028	0.023
1997	93.2	2	**0.107**	0.078	0.073	0.049	0.039	0.030	0.025
1998	98.9	0	0.096	0.078	0.063	0.049	0.039	0.029	0.024
1999	98.9	0	0.077	0.070	0.065	0.053	0.042	0.032	0.025
2000	*63.6*	*0*	*0.071*	*0.065*	*0.062*	*0.052*	*0.043*	*0.028*	*0.023*
2001	75.9	0	0.073	0.062	0.058	0.048	0.041	0.032	0.026
2002	84.9	0	0.078	0.064	0.054	0.047	0.040	0.032	0.027
2003	97.5	0	0.098	0.079	0.061	0.053	0.044	0.028	0.024
2004	96.4	0	0.080	0.064	0.049	0.042	0.038	0.029	0.024
2005	92.6	0	0.072	0.062	0.054	0.045	0.041	0.033	0.028
2006	98.9	1	**0.108**	0.067	0.065	0.057	0.046	0.033	0.027
2007	98.6	1	**0.112**	0.072	0.063	0.056	0.047	0.035	0.028
2008	100.0	0	0.074	0.063	0.056	0.048	0.041	0.031	0.027

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

Table 44: Percentiles of daily maximum one-hour ozone at Footscray (1995–2008)

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	95.9	0	0.091	0.063	0.058	0.043	0.037	0.029	0.025
1996	96.4	0	0.082	0.069	0.063	0.049	0.040	0.028	0.025
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
2007	99.2	1	**0.127**	0.067	0.063	0.057	0.049	0.035	0.029
2008	98.4	0	0.073	0.065	0.055	0.048	0.041	0.032	0.026

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

Table 45: Percentiles of daily maximum one-hour ozone at Geelong South (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	82.2	0	0.071	0.056	0.052	0.040	0.030	0.026	0.023
1996	86.8	0	0.091	0.063	0.056	0.044	0.033	0.027	0.022
1997	*0.0*								
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
2007	99.7	0	0.088	0.068	0.063	0.053	0.045	0.035	0.030
2008	98.6	0	0.084	0.073	0.063	0.047	0.038	0.032	0.029

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

Table 46: Percentiles of daily maximum one-hour ozone at Melton (2002–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
2002	*14.2*		*0.076*	*0.069*	*0.062*	*0.060*	*0.048*	*0.036*	*0.029*
2003	97.8	1	**0.112**	0.083	0.074	0.056	0.046	0.032	0.029
2004	94.0	0	0.076	0.053	0.050	0.047	0.040	0.033	0.028
2005	94.0	0	0.079	0.063	0.056	0.048	0.043	0.036	0.031
2006	99.2	1	**0.126**	0.084	0.067	0.053	0.046	0.036	0.030
2007	89.6	0	0.085	0.076	0.071	0.064	0.054	0.037	0.032
2008	90.2	0	0.067	0.056	0.052	0.047	0.041	0.033	0.030

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

Table 47: Percentiles of daily maximum one-hour ozone at Mooroolbark (2002–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
2002	*57.5*	*0*	*0.089*	*0.070*	*0.055*	*0.046*	*0.038*	*0.033*	*0.028*
2003	99.7	0	0.098	0.072	0.065	0.055	0.047	0.031	0.026
2004	95.6	0	0.072	0.056	0.053	0.047	0.042	0.034	0.027
2005	97.8	0	0.089	0.064	0.053	0.045	0.042	0.035	0.029
2006	96.2	1	**0.101**	0.086	0.071	0.058	0.048	0.036	0.028
2007	99.7	0	0.084	0.076	0.072	0.057	0.051	0.038	0.031
2008	98.6	0	0.081	0.064	0.057	0.051	0.045	0.034	0.027

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

Table 48: Percentiles of daily maximum one-hour ozone at Point Cook (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	99.7	1	**0.111**	0.076	0.060	0.046	0.039	0.031	0.027
1996	99.5	0	0.090	0.079	0.069	0.051	0.038	0.030	0.026
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
2007	99.5	0	0.095	0.070	0.064	0.057	0.047	0.038	0.034
2008	99.7	0	0.088	0.081	0.065	0.049	0.043	0.035	0.031

Exceedences shown in bold.

Table 49: Percentiles of daily maximum one-hour ozone at Point Henry (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	*69.3*	*0*	*0.060*	*0.047*	*0.044*	*0.042*	*0.039*	*0.036*	*0.033*
1996	98.1	1	**0.104**	0.065	0.058	0.047	0.036	0.032	0.029
1997	80.3	0	0.081	0.062	0.057	0.046	0.038	0.029	0.024
1998	*27.7*	*0*	*0.087*	*0.072*	*0.067*	*0.052*	*0.043*	*0.032*	*0.025*
1999	*0.0*								
2000	*14.2*								
2001	*57.3*	*0*	*0.089*	*0.074*	*0.068*	*0.052*	*0.045*	*0.032*	*0.024*
2002	97.0	0	0.069	0.065	0.059	0.045	0.040	0.030	0.027
2003	97.8	0	0.095	0.075	0.071	0.052	0.041	0.030	0.025
2004	97.3	0	0.093	0.060	0.054	0.043	0.037	0.029	0.025
2005	99.5	0	0.088	0.059	0.057	0.048	0.038	0.033	0.029
2006	98.9	1	**0.144**	0.070	0.057	0.047	0.039	0.030	0.026
2007	99.7	1	**0.101**	0.062	0.059	0.048	0.041	0.030	0.027
2008	98.6	0	0.080	0.064	0.057	0.043	0.036	0.030	0.027

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

Table 50: Percentiles of daily maximum one-hour ozone at Moe (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	98.1	0	0.068	0.051	0.049	0.042	0.035	0.030	0.026
1996	98.4	0	0.052	0.042	0.038	0.034	0.030	0.025	0.022
1997	92.9	0	0.072	0.058	0.049	0.036	0.031	0.026	0.021
1998	94.2	0	0.046	0.043	0.039	0.031	0.028	0.022	0.018
1999	81.1	0	0.063	0.042	0.038	0.032	0.030	0.027	0.022
2000	86.6	0	0.066	0.055	0.049	0.040	0.034	0.029	0.025
2001	99.5	0	0.070	0.052	0.048	0.043	0.037	0.030	0.024
2002	96.4	0	0.059	0.050	0.046	0.041	0.036	0.031	0.027
2003	97.3	0	0.083	0.061	0.060	0.051	0.043	0.031	0.026
2004	100.0	0	0.055	0.052	0.049	0.044	0.039	0.031	0.027
2005	99.5	0	0.062	0.055	0.047	0.041	0.036	0.031	0.027
2006	89.0	1	**0.104**	0.077	0.069	0.051	0.041	0.030	0.027
2007	97.8	0	0.099	0.070	0.065	0.054	0.044	0.034	0.030
2008	100.0	0	0.057	0.052	0.047	0.038	0.031	0.024	0.021

Exceedences shown in bold.

Table 51: Percentiles of daily maximum one-hour ozone at Traralgon (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	92.6	0	0.050	0.043	0.041	0.036	0.031	0.025	0.021
1996	80.8	0	0.049	0.043	0.041	0.036	0.033	0.028	0.022
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
2007	99.2	0	0.094	0.067	0.061	0.052	0.041	0.031	0.027
2008	100.0	0	0.061	0.055	0.048	0.038	0.032	0.026	0.023

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

Table 52: Percentiles of daily maximum four-hour ozone at Alphington (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	95.9	0	0.067	0.050	0.046	0.039	0.032	0.025	0.021
1996	97.3	0	0.064	0.053	0.052	0.042	0.036	0.025	0.020
1997	91.2	0	0.078	0.070	0.060	0.049	0.035	0.024	0.018
1998	96.4	0	0.075	0.055	0.050	0.040	0.033	0.022	0.016
1999	97.8	0	0.067	0.054	0.052	0.041	0.033	0.025	0.018
2000	97.3	0	0.060	0.047	0.046	0.042	0.033	0.022	0.018
2001	91.5	0	0.062	0.051	0.046	0.040	0.034	0.025	0.020
2002	89.3	0	0.046	0.044	0.043	0.038	0.033	0.026	0.021
2003	95.9	1	**0.090**	0.058	0.053	0.047	0.038	0.028	0.023
2004	96.4	0	0.069	0.045	0.044	0.038	0.034	0.026	0.022
2005	92.6	0	0.078	0.070	0.060	0.049	0.035	0.024	0.018
2006	90.1	3	**0.116**	0.073	0.063	0.054	0.045	0.031	0.025
2007	98.6	1	**0.115**	0.065	0.062	0.053	0.046	0.033	0.027
2008	97.3	0	0.063	0.050	0.047	0.038	0.035	0.027	0.022

Exceedences shown in bold.

Table 53: Percentiles of daily maximum four-hour ozone at Brighton (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	95.1	1	**0.087**	0.067	0.058	0.043	0.036	0.028	0.024
1996	95.6	0	0.078	0.065	0.056	0.044	0.035	0.027	0.022
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
2007	99.7	1	**0.111**	0.068	0.063	0.054	0.049	0.036	0.031
2008	98.6	0	0.079	0.068	0.066	0.047	0.041	0.033	0.028

Exceedences shown in bold.

Table 54: Percentiles of daily maximum four-hour ozone at Dandenong (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	97.0	1	**0.082**	0.052	0.049	0.041	0.033	0.028	0.023
1996	94.2	0	0.068	0.056	0.050	0.044	0.035	0.027	0.022
1997	93.2	1	**0.092**	0.068	0.062	0.047	0.035	0.028	0.024
1998	98.9	0	0.076	0.065	0.059	0.044	0.036	0.027	0.023
1999	98.6	0	0.074	0.062	0.058	0.048	0.039	0.030	0.023
2000	*64.1*	*0*	*0.066*	*0.060*	*0.056*	*0.047*	*0.040*	*0.027*	*0.021*
2001	75.3	0	0.063	0.055	0.054	0.045	0.038	0.030	0.025
2002	85.2	0	0.063	0.053	0.052	0.043	0.038	0.030	0.025
2003	97.8	2	**0.093**	0.067	0.059	0.047	0.040	0.027	0.023
2004	96.7	0	0.067	0.058	0.046	0.040	0.035	0.027	0.023
2005	92.6	0	0.067	0.054	0.052	0.043	0.039	0.031	0.026
2006	98.6	1	**0.096**	0.061	0.058	0.052	0.042	0.031	0.026
2007	98.6	1	**0.106**	0.064	0.060	0.052	0.044	0.033	0.027
2008	100.0	0	0.073	0.058	0.053	0.044	0.040	0.030	0.025

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

Table 55: Percentiles of daily maximum four-hour ozone at Footscray (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	95.9	0	0.080	0.058	0.051	0.039	0.034	0.028	0.023
1996	96.2	0	0.070	0.062	0.057	0.043	0.036	0.027	0.023
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
2007	98.9	1	**0.113**	0.060	0.057	0.052	0.045	0.033	0.028
2008	98.1	0	0.064	0.059	0.053	0.042	0.039	0.030	0.025

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

Table 56: Percentiles of daily maximum four-hour ozone at Geelong South (1995–2008)

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	91.8	0	0.065	0.051	0.048	0.037	0.028	0.025	0.022
1996	86.8	0	0.076	0.058	0.051	0.039	0.031	0.026	0.021
1997	*0.0*								
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
2007	99.7	0	0.076	0.062	0.057	0.049	0.042	0.034	0.029
2008	98.1	0	0.076	0.067	0.060	0.045	0.038	0.031	0.028

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

Table 57: Percentiles of daily maximum four-hour ozone at Melton (2002–08)

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
2002	*14.5*								
2003	97.8	4	**0.099**	0.077	0.063	0.052	0.042	0.032	0.028
2004	94.0	0	0.068	0.050	0.047	0.043	0.038	0.031	0.027
2005	94.2	0	0.075	0.054	0.051	0.045	0.041	0.034	0.030
2006	99.2	3	**0.115**	0.073	0.060	0.051	0.043	0.034	0.029
2007	89.9	0	0.080	0.068	0.066	0.057	0.050	0.036	0.031
2008	90.2	0	0.057	0.052	0.048	0.045	0.039	0.032	0.029

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

Table 58: Percentiles of daily maximum four-hour ozone at Mooroolbark (2002–08)

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
2002	*57.5*	*0*	*0.075*	*0.063*	*0.047*	*0.041*	*0.036*	*0.030*	*0.026*
2003	98.9	3	**0.090**	0.065	0.056	0.050	0.044	0.030	0.025
2004	95.6	0	0.059	0.050	0.049	0.044	0.038	0.032	0.025
2005	97.8	0	0.072	0.055	0.049	0.043	0.039	0.033	0.028
2006	96.2	2	**0.091**	0.077	0.064	0.054	0.045	0.034	0.026
2007	99.5	0	0.077	0.072	0.066	0.054	0.047	0.036	0.030
2008	98.6	0	0.073	0.057	0.053	0.047	0.041	0.032	0.027

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

Table 59: Percentiles of daily maximum four-hour ozone at Point Cook (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	99.7	1	**0.095**	0.063	0.057	0.043	0.036	0.030	0.026
1996	99.5	0	0.079	0.066	0.057	0.045	0.034	0.029	0.025
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
2007	99.5	1	**0.086**	0.067	0.060	0.052	0.044	0.037	0.033
2008	99.7	2	**0.082**	0.074	0.061	0.045	0.040	0.034	0.030

Exceedences shown in bold.

Table 60: Percentiles of daily maximum four-hour ozone at Point Henry (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	*69.3*	*0*	*0.056*	*0.042*	*0.042*	*0.039*	*0.038*	*0.035*	*0.032*
1996	98.1	1	**0.097**	0.058	0.054	0.042	0.034	0.031	0.028
1997	80.3	0	0.070	0.059	0.053	0.043	0.038	0.028	0.023
1998	*27.7*	*0*	*0.076*	*0.064*	*0.060*	*0.043*	*0.038*	*0.030*	*0.023*
1999	*0.0*								
2000	*14.2*	*0*	*0.059*	*0.058*	*0.058*	*0.049*	*0.044*	*0.034*	*0.029*
2001	*57.3*	*1*	***0.085***	*0.067*	*0.061*	*0.051*	*0.042*	*0.030*	*0.023*
2002	97.0	0	0.069	0.065	0.059	0.045	0.040	0.030	0.027
2003	97.8	1	**0.083**	0.065	0.061	0.049	0.037	0.029	0.024
2004	97.3	1	**0.085**	0.056	0.048	0.041	0.035	0.027	0.024
2005	99.5	0	0.076	0.056	0.051	0.045	0.036	0.031	0.028
2006	98.4	1	**0.126**	0.067	0.053	0.043	0.036	0.029	0.025
2007	99.7	1	**0.085**	0.058	0.052	0.045	0.038	0.029	0.026
2008	98.6	0	0.073	0.058	0.050	0.041	0.035	0.029	0.026

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

Table 61: Percentiles of daily maximum four-hour ozone at Moe (1995–2008)

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	98.1	0	0.059	0.047	0.044	0.039	0.034	0.029	0.024
1996	98.4	0	0.047	0.038	0.036	0.032	0.029	0.025	0.021
1997	92.9	0	0.067	0.050	0.047	0.033	0.029	0.024	0.020
1998	94.2	0	0.044	0.038	0.035	0.030	0.025	0.020	0.017
1999	81.1	0	0.045	0.039	0.036	0.030	0.028	0.025	0.020
2000	86.6	0	0.056	0.051	0.045	0.037	0.033	0.028	0.024
2001	99.5	0	0.054	0.047	0.044	0.040	0.034	0.028	0.023
2002	96.7	0	0.056	0.046	0.041	0.037	0.035	0.030	0.026
2003	97.3	0	0.072	0.059	0.056	0.048	0.038	0.029	0.025
2004	100.0	0	0.051	0.046	0.044	0.040	0.036	0.030	0.025
2005	99.5	0	0.051	0.049	0.042	0.038	0.034	0.030	0.025
2006	88.8	3	**0.094**	0.065	0.056	0.047	0.038	0.030	0.025
2007	97.8	1	**0.089**	0.064	0.059	0.050	0.040	0.033	0.029
2008	100.0	0	0.057	0.048	0.043	0.036	0.029	0.023	0.020

Exceedences shown in bold.

Table 62: Percentiles of daily maximum four-hour ozone at Traralgon (1995–2008)

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	93.2	0	0.048	0.040	0.038	0.032	0.028	0.024	0.020
1996	80.8	0	0.043	0.039	0.037	0.033	0.031	0.026	0.021
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
2007	99.2	1	**0.082**	0.058	0.056	0.047	0.037	0.029	0.026
2008	100.0	0	0.053	0.050	0.042	0.036	0.030	0.025	0.022

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

Sulfur dioxide

Table 63: 2008 percentiles of daily peak one-hour sulfur dioxide concentrations in Victoria

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

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

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	98.4	0.014	0.010	0.009	0.006	0.005	0.003	0.002
AltonaNorth	98.9	0.059	0.046	0.038	0.029	0.023	0.011	0.006
GeelongSouth	96.7	0.050	0.032	0.024	0.016	0.014	0.007	0.003
Latrobe Valley								
Moe	99.2	0.033	0.025	0.023	0.016	0.012	0.006	0.002
Traralgon	97.8	0.170	0.042	0.032	0.018	0.013	0.009	0.005

Table 64: 2008 percentiles of daily sulfur dioxide concentrations in Victoria

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

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

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	98.4	0.005	0.003	0.002	0.002	0.002	0.001	0.001
AltonaNorth	98.9	0.015	0.009	0.007	0.006	0.004	0.002	0.001
GeelongSouth	96.7	0.007	0.004	0.004	0.003	0.002	0.001	0.001
Latrobe Valley								
Moe	99.2	0.007	0.006	0.005	0.004	0.003	0.002	0.001
Traralgon	97.8	0.026	0.008	0.007	0.005	0.004	0.003	0.002

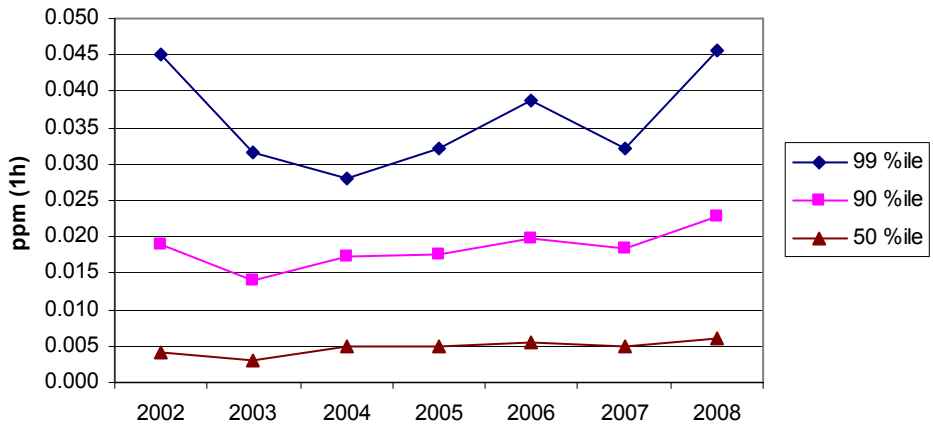

Figure 10: Percentiles of daily maximum one-hour sulfur dioxide (Altona North 2002-2008)

As there are few SO_2 stations, and some changes from year to year, only data from Altona North is presented. This station consistently records the highest readings in the Port Phillip Region.

Table 65: Percentiles of daily maximum one-hour sulfur dioxide at Alphington (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	*71.5*	*0*	*0.015*	*0.008*	*0.007*	*0.005*	*0.004*	*0.002*	*0.000*
1996	97.0	0	0.008	0.006	0.006	0.005	0.003	0.002	0.001
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	0.021	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
2007	99.5	0	0.022	0.010	0.008	0.006	0.005	0.004	0.002
2008	98.4	0	0.014	0.010	0.009	0.006	0.005	0.003	0.002

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

Table 66: Percentiles of daily maximum one-hour sulfur dioxide at Altona North (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	97.5	0	0.039	0.023	0.022	0.018	0.015	0.008	0.004
1996	87.7	0	0.041	0.025	0.021	0.017	0.012	0.008	0.005
1997	96.4	0	0.069	0.054	0.048	0.031	0.022	0.009	0.004
1998	92.9	0	0.125	0.080	0.073	0.051	0.035	0.017	0.007
1999	96.2	0	0.059	0.044	0.039	0.032	0.024	0.012	0.005
2000	92.3	0	0.068	0.049	0.044	0.031	0.024	0.010	0.003
2001	95.6	0	0.073	0.053	0.043	0.035	0.026	0.012	0.004
2002	97.3	0	0.122	0.045	0.037	0.024	0.019	0.010	0.004
2003	94.8	0	0.036	0.032	0.027	0.020	0.014	0.007	0.003
2004	97.5	0	0.044	0.028	0.026	0.021	0.017	0.010	0.005
2005	96.2	0	0.044	0.032	0.028	0.021	0.018	0.009	0.005
2006	92.3	0	0.053	0.039	0.031	0.024	0.020	0.011	0.005
2007	97.3	0	0.039	0.032	0.029	0.023	0.018	0.010	0.005
2008	98.9	0	0.059	0.046	0.038	0.029	0.023	0.011	0.006

Table 67: Percentiles of daily maximum one-hour sulfur dioxide at Geelong South (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	88.2	0	0.088	0.030	0.023	0.015	0.011	0.006	0.002
1996	76.8	0	0.032	0.026	0.023	0.016	0.010	0.004	0.001
1997	*0.0*								
1998	*68.8*	*0*	*0.038*	*0.023*	*0.021*	*0.016*	*0.012*	*0.008*	*0.003*
1999	94.0	0	0.032	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
2007	98.9	0	0.083	0.033	0.027	0.017	0.013	0.008	0.003
2008	96.7	0	0.050	0.032	0.024	0.016	0.014	0.007	0.003

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

Table 68: Percentiles of daily maximum one-hour sulfur dioxide at RMIT (CBD) (1995–2006)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	*2.7*	*0*	*0.008*	*0.008*	*0.007*	*0.007*	*0.005*	*0.004*	*0.003*
1996	82.8	0	0.016	0.014	0.013	0.009	0.007	0.004	0.001
1997	97.8	0	0.029	0.025	0.018	0.014	0.011	0.007	0.004
1998	92.6	0	0.038	0.020	0.016	0.013	0.010	0.007	0.003
1999	98.6	0	0.020	0.013	0.012	0.010	0.008	0.005	0.002
2000	96.7	0	0.017	0.014	0.013	0.010	0.007	0.004	0.002
2001	94.2	0	0.018	0.015	0.013	0.012	0.009	0.006	0.002
2002	94.2	0	0.024	0.017	0.013	0.012	0.010	0.006	0.002
2003	99.2	0	0.035	0.017	0.013	0.010	0.008	0.005	0.002
2004	98.4	0	0.023	0.017	0.015	0.011	0.009	0.006	0.003
2005	98.9	0	0.017	0.015	0.012	0.010	0.008	0.005	0.003
2006	76.2	0	0.034	0.020	0.017	0.014	0.011	0.007	0.003

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

Table 69: Percentiles of daily maximum one-hour sulfur dioxide at Moe (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	97.8	0	0.025	0.021	0.017	0.011	0.008	0.004	0.002
1996	98.9	0	0.033	0.019	0.015	0.012	0.008	0.004	0.002
1997	92.3	0	0.047	0.024	0.018	0.014	0.010	0.005	0.002
1998	94.8	0	0.032	0.023	0.021	0.013	0.009	0.005	0.002
1999	94.0	0	0.030	0.020	0.017	0.015	0.011	0.006	0.002
2000	98.4	0	0.039	0.032	0.025	0.017	0.013	0.007	0.004
2001	98.4	0	0.034	0.026	0.022	0.016	0.012	0.007	0.003
2002	97.5	0	0.046	0.022	0.020	0.014	0.010	0.005	0.003
2003	99.2	0	0.030	0.026	0.024	0.019	0.013	0.006	0.003
2004	99.7	0	0.048	0.024	0.021	0.016	0.009	0.004	0.001
2005	100.0	0	0.047	0.029	0.026	0.017	0.012	0.006	0.002
2006	88.5	0	0.046	0.028	0.024	0.017	0.012	0.005	0.002
2007	98.9	0	0.066	0.032	0.019	0.015	0.011	0.007	0.003
2008	99.2	0	0.033	0.025	0.023	0.016	0.012	0.006	0.002

Table 70: Percentiles of daily maximum one-hour sulfur dioxide at Traralgon (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	88.5	0	0.049	0.021	0.020	0.015	0.011	0.007	0.004
1996	85.8	0	0.032	0.017	0.014	0.011	0.008	0.006	0.003
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	97.5	0	0.095	0.037	0.033	0.022	0.017	0.010	0.006
2007	96.2	0	0.092	0.041	0.029	0.022	0.016	0.011	0.006
2008	97.8	0	0.170	0.042	0.032	0.018	0.013	0.009	0.005

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

Table 71: Percentiles of daily average sulfur dioxide at Alphington (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	*71.5*	*0*	*0.002*	*0.001*	*0.000*	*0.000*	*0.000*	*-0.001*	*-0.001*
1996	97.0	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000
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
2007	99.5	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001
2008	98.4	0	0.005	0.003	0.002	0.002	0.002	0.001	0.001

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

Table 72: Percentiles of daily average sulfur dioxide at Altona North (1995–2008)

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

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

Year	Data availability	No. of exceedences	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	97.5	0	0.007	0.005	0.005	0.003	0.002	0.001	0.000
1996	87.7	0	0.018	0.008	0.005	0.004	0.004	0.002	0.001
1997	96.4	0	0.011	0.010	0.008	0.005	0.003	0.001	0.000
1998	92.9	0	0.021	0.017	0.014	0.010	0.005	0.003	0.001
1999	96.2	0	0.016	0.009	0.006	0.005	0.003	0.001	0.000
2000	92.3	0	0.010	0.008	0.006	0.004	0.003	0.001	0.000
2001	95.6	0	0.033	0.013	0.011	0.006	0.004	0.001	0.000
2002	97.3	0	0.019	0.008	0.008	0.005	0.003	0.001	0.001
2003	94.8	0	0.009	0.007	0.005	0.003	0.002	0.001	0.000
2004	97.5	0	0.013	0.008	0.006	0.005	0.003	0.002	0.001
2005	96.2	0	0.010	0.007	0.006	0.004	0.003	0.002	0.001
2006	92.3	0	0.019	0.009	0.006	0.004	0.003	0.002	0.001
2007	97.3	0	0.013	0.008	0.006	0.004	0.003	0.002	0.001
2008	98.9	0	0.015	0.009	0.007	0.006	0.004	0.002	0.001

Table 73: Percentiles of daily average sulfur dioxide at Geelong South (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	98.4	0	0.004	0.003	0.003	0.002	0.001	0.000	-0.001
1996	76.8	0	0.005	0.004	0.003	0.002	0.001	0.000	-0.001
1997	*0.0*								
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
2007	98.9	0	0.009	0.004	0.003	0.003	0.002	0.001	0.001
2008	96.7	0	0.007	0.004	0.004	0.003	0.002	0.001	0.001

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

Table 74: Percentiles of daily average sulfur dioxide at RMIT (CBD) (1995–2006)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	*2.7*								
1996	82.8	0	0.003	0.003	0.002	0.002	0.001	0.000	-0.001
1997	97.8	0	0.006	0.006	0.005	0.004	0.003	0.002	0.001
1998	92.6	0	0.007	0.005	0.004	0.003	0.002	0.001	0.000
1999	98.6	0	0.005	0.003	0.003	0.002	0.002	0.001	0.000
2000	96.7	0	0.006	0.004	0.003	0.002	0.002	0.001	0.000
2001	94.2	0	0.004	0.004	0.003	0.002	0.002	0.000	0.000
2002	94.2	0	0.005	0.004	0.003	0.003	0.002	0.001	0.000
2003	99.2	0	0.006	0.005	0.004	0.003	0.002	0.001	0.001
2004	98.4	0	0.007	0.004	0.004	0.003	0.003	0.002	0.001
2005	98.9	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001
2006	76.2	0	0.008	0.005	0.004	0.003	0.003	0.002	0.001

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

Table 75: Percentiles of daily average sulfur dioxide at Moe (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	97.8	0	0.007	0.005	0.004	0.004	0.003	0.002	0.001
1996	98.9	0	0.008	0.005	0.004	0.003	0.003	0.002	0.001
1997	92.3	0	0.010	0.007	0.006	0.004	0.003	0.002	0.001
1998	94.8	0	0.007	0.005	0.005	0.004	0.003	0.001	0.000
1999	94.0	0	0.008	0.005	0.005	0.004	0.003	0.002	0.001
2000	98.4	0	0.012	0.008	0.007	0.006	0.005	0.003	0.002
2001	98.4	0	0.009	0.006	0.006	0.005	0.004	0.003	0.001
2002	97.5	0	0.010	0.007	0.006	0.004	0.004	0.002	0.001
2003	99.2	0	0.009	0.007	0.007	0.005	0.004	0.002	0.001
2004	99.7	0	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2005	100.0	0	0.009	0.006	0.004	0.004	0.003	0.002	0.001
2006	88.5	0	0.009	0.007	0.005	0.004	0.003	0.002	0.001
2007	98.4	0	0.010	0.006	0.005	0.004	0.003	0.002	0.001
2008	99.2	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001

Table 76: Percentiles of daily average sulfur dioxide at Traralgon (1995–2008)

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

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

Year	Data availability (% of days)	No. of exceedences (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	88.5	0	0.005	0.004	0.004	0.003	0.003	0.002	0.001
1996	85.8	0	0.008	0.004	0.003	0.003	0.002	0.002	0.001
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	97.5	0	0.023	0.007	0.006	0.005	0.004	0.003	0.002
2007	95.6	0	0.011	0.009	0.008	0.006	0.005	0.003	0.002
2008	97.8	0	0.026	0.008	0.007	0.005	0.004	0.003	0.002

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

Particles as PM_{10}

Table 77: 2008 percentiles of daily PM10 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 Performance monitoring station	Data availability (% of days)	Max (μg/m³)	Percentiles (μg/m³) 99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	99.5	**71.1**	45.2	40.0	34.8	29.1	23.5	17.8
Brighton	100.0	**65.3**	**52.5**	43.8	33.4	26.7	21.8	16.1
Dandenong	99.2	**88.6**	**61.3**	**52.8**	39.4	33.2	25.4	19.1
Footscray	100.0	**89.3**	48.6	46.0	42.0	33.1	25.8	19.2
Geelong South	99.7	**168.7**	**66.6**	48.8	39.4	35.4	26.4	18.9
Mooroolbark	97.8	**99.9**	**60.6**	**54.7**	44.5	37.8	27.7	21.1
Richmond	97.5	**73.5**	**53.2**	44.3	34.0	27.2	22.4	17.4
Latrobe Valley								
Moe	98.9	**90.9**	**61.9**	46.5	36.3	27.8	20.8	15.8
Traralgon	100.0	**64.9**	42.1	39.2	33.2	27.9	22.4	17.6

Exceedences shown in bold.

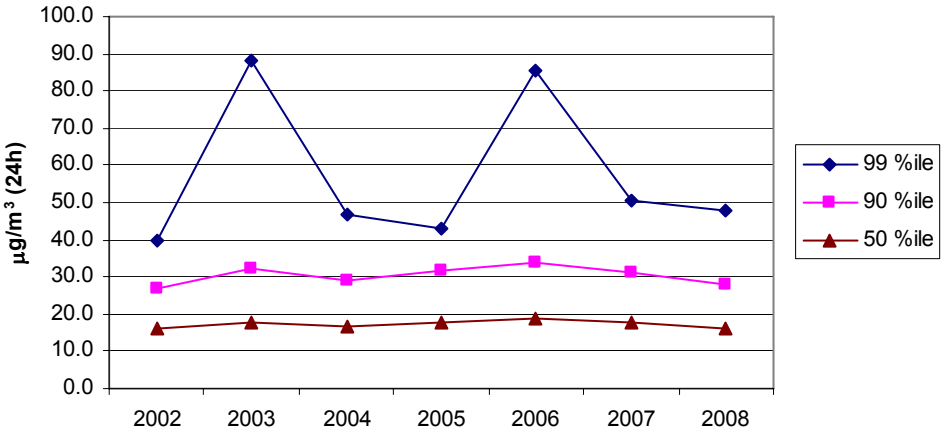

Figure 11: Percentiles of daily PM_{10} (average of Port Phillip stations 2002-2008)

In interpreting trends, it should be noted that PM_{10} monitoring commenced at Geelong and Mooroolbark during 2002 (<75% data capture this year) and these stations, which tend to record higher PM_{10}, are not included in the average for 2002.

Table 78: Percentiles of 24-hour PM10 at Alphington (1995–2008)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
1995	*63.0*	*0*	*43.3*	*37.3*	*35.1*	*30.4*	*26.1*	*21.2*	*17.0*
1996	97.0	0	41.7	39.6	37.8	30.4	26.1	21.5	17.2
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
2007	100.0	2	**83.1**	43.5	40.4	35.2	30.8	22.8	17.6
2008	99.5	3	**71.1**	45.2	40.0	34.8	29.1	23.5	17.8

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

Table 79: Percentiles of 24-hour PM10 at Brighton (1996–2008)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
1996	*5.5*								
1997	*47.4*	*1*	***54.8***	*43.9*	*36.9*	*32.9*	*30.2*	*22.4*	*17.7*
1998	85.2	0	49.0	44.7	40.3	34.0	29.0	21.4	16.4
1999	99.5	0	49.0	32.0	31.0	26.0	23.9	19.3	15.7
2000	94.0	2	**52.6**	45.0	32.5	26.4	23.4	17.9	13.8
2001	95.6	1	**70.8**	33.4	30.9	26.5	24.3	19.4	13.9
2002	97.3	1	**69.1**	34.7	31.1	28.2	24.8	19.6	14.7
2003	88.8	8	**182.3**	**89.3**	**67.8**	35.9	30.5	21.5	15.8
2004	89.3	0	44.9	40.5	36.6	30.4	26.4	20.9	15.9
2005	84.1	0	41.5	33.8	32.7	28.0	25.8	19.7	14.4
2006	89.9	6	**109.1**	**78.0**	46.2	36.7	25.9	19.8	13.8
2007	99.7	1	**78.4**	35.9	32.7	29.4	24.1	18.1	13.7
2008	100.0	5	**65.3**	**52.5**	43.8	33.4	26.7	21.8	16.1

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

Table 80: Percentiles of 24-hour PM10 at Dandenong (1998–2008)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
1998	*69.6*	*1*	***50.4***	*42.8*	*41.1*	*35.1*	*30.3*	*23.5*	*17.4*
1999	*65.2*	*1*	***52.3***	*40.9*	*37.0*	*32.1*	*27.3*	*22.4*	*17.1*
2000	*73.8*	*1*	***74.5***	*43.8*	*39.8*	*32.3*	*29.3*	*22.5*	*15.3*
2001	*14.5*								
2002	87.4	3	**84.8**	45.6	37.6	31.5	26.5	21.0	15.8
2003	93.4	8	**295.1**	**92.3**	**52.4**	39.0	30.9	23.4	17.6
2004	92.3	1	**50.1**	44.5	42.1	35.7	30.8	23.4	16.7
2005	90.1	0	43.7	40.5	37.5	34.0	31.5	24.8	17.4
2006	100.0	12	**149.2**	**90.9**	**71.3**	47.5	38.2	30.0	22.8
2007	100.0	5	**84.6**	**52.3**	47.3	39.4	35.0	27.4	19.1
2008	99.2	8	**88.6**	**61.3**	**52.8**	39.4	33.2	25.4	19.1

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

Table 81: Percentiles of 24-hour PM10 at Footscray (1996–2008)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
1996	*13.1*								
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
2007	99.5	4	**65.9**	49.8	42.2	38.6	32.2	24.4	17.8
2008	100.0	4	**89.3**	48.6	46.0	42.0	33.1	25.8	19.2

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

Table 82: Percentiles of 24-hour PM10 at Geelong (2002–08)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
2002	*32.1*	*6*	***81.1***	***73.2***	***56.8***	*49.5*	*35.8*	*27.4*	*20.1*
2003	94.0	10	**148.7**	**80.2**	**57.7**	45.3	35.3	25.6	18.4
2004	91.8	11	**149.0**	**62.5**	**53.5**	44.0	34.3	26.1	18.3
2005	96.2	7	**83.0**	**55.2**	49.3	40.6	33.7	26.6	18.5
2006	91.0	17	**116.4**	**98.0**	**72.2**	49.1	38.0	26.9	19.6
2007	98.9	14	**129.1**	**65.2**	**59.9**	43.4	32.8	26.5	19.1
2008	99.7	6	**168.7**	**66.6**	48.8	39.4	35.4	26.4	18.9

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

Table 83: Percentiles of 24-hour PM10 at Mooroolbark (2002–08)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
2002	*57.0*	*1*	***66.7***	*44.9*	*44.3*	*39.7*	*33.2*	*27.0*	*19.9*
2003	91.8	13	**322.2**	**118.1**	**91.3**	45.6	37.4	26.8	19.1
2004	94.8	1	**63.9**	46.0	42.8	34.7	30.1	23.9	17.3
2005	99.5	9	**57.6**	**53.7**	**52.1**	43.1	36.1	27.4	19.3
2006	97.3	17	**219.9**	**135.9**	**69.6**	46.1	39.2	29.1	21.3
2007	100.0	11	**136.1**	**63.0**	**51.7**	43.0	37.3	27.4	19.4
2008	97.8	10	**99.9**	**60.6**	**54.7**	44.5	37.8	27.7	21.1

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

Table 84: Percentiles of 24-hour PM10 at Richmond (2002–08)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
2002	92.6	1	**70.0**	40.3	34.7	29.2	26.5	21.2	16.5
2003	92.3	6	**274.9**	**73.8**	48.2	33.2	29.1	21.6	16.5
2004	100.0	0	43.9	40.6	35.7	30.0	26.0	20.7	15.9
2005	96.2	1	**54.9**	39.0	37.0	32.0	28.9	22.5	17.1
2006	97.5	9	**140.0**	**78.6**	**53.5**	37.9	31.4	24.3	18.4
2007	94.0	3	**78.7**	44.8	36.6	32.5	27.9	21.0	16.3
2008	97.5	5	**73.5**	**53.2**	44.3	34.0	27.2	22.4	17.4

Exceedences shown in bold.

Table 85: Percentiles of 24-hour PM10 at RMIT (CBD) (2002–06)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
2002	*23.3*	*2*	***82.9***	***66.3***	***51.5***	*37.6*	*33.3*	*27.2*	*21.1*
2003	96.7	11	**279.4**	**83.5**	**58.3**	38.8	31.3	23.9	18.7
2004	94.5	2	**79.8**	46.7	41.8	32.3	28.9	23.5	18.2
2005	98.4	0	41.7	36.5	35.2	33.2	29.4	22.8	17.4
2006	78.4	2	**58.0**	43.4	41.7	36.9	30.1	23.6	18.0

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

Table 86: Percentiles of 24-hour PM10 at Moe (2002–2008)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
2002	*14.8*								
2003	98.1	11	**288.8**	**81.2**	**56.2**	37.7	31.0	21.2	14.7
2004	90.2	1	**56.3**	41.2	37.6	31.8	27.8	20.0	14.5
2005	99.7	0	36.9	33.4	32.6	28.5	24.7	19.8	14.2
2006	87.9	15	**254.0**	**135.3**	**85.2**	42.3	28.7	21.6	16.0
2007	90.7	13	**137.2**	**71.0**	**56.3**	43.5	35.1	25.6	18.6
2008	98.9	6	**90.9**	**61.9**	46.5	36.3	27.8	20.8	15.8

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

Table 87: Percentiles of 24-hour PM10 at Traralgon (2002–2008)

AAQ NEPM standard: 50 μg/m^3 (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 (μg/m^3)	Percentiles (μg/m^3)					
				99th	98th	95th	90th	75th	50th
2002	*15.3*	*0*	*37.1*	*33.2*	*30.0*	*28.8*	*26.4*	*23.5*	*18.7*
2003	98.1	7	**237.8**	**59.3**	47.5	37.2	27.3	21.6	16.8
2004	99.7	0	44.5	34.2	31.8	29.8	25.9	20.6	15.9
2005	90.1	0	44.9	41.0	36.8	31.5	26.3	20.8	16.2
2006	99.7	8	**193.5**	**82.6**	**50.3**	32.4	27.3	22.1	17.5
2007	96.4	5	**151.2**	**52.0**	40.8	32.3	27.0	21.7	17.0
2008	100.0	2	**64.9**	42.1	39.2	33.2	27.9	22.4	17.6

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

Particles as $PM_{2.5}$

Table 88: 2008 percentiles of Daily PM2.5 concentrations in Victoria

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

Region Performance monitoring station	Data availability (% of days)	Max (μg/m³)	Percentiles (μg/m³) 99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	100.0	**46.7**	**34.5**	**32.2**	15.8	11.6	8.6	6.0
Footscray	92.6	**30.5**	**29.2**	23.9	13.9	11.9	7.9	5.5

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

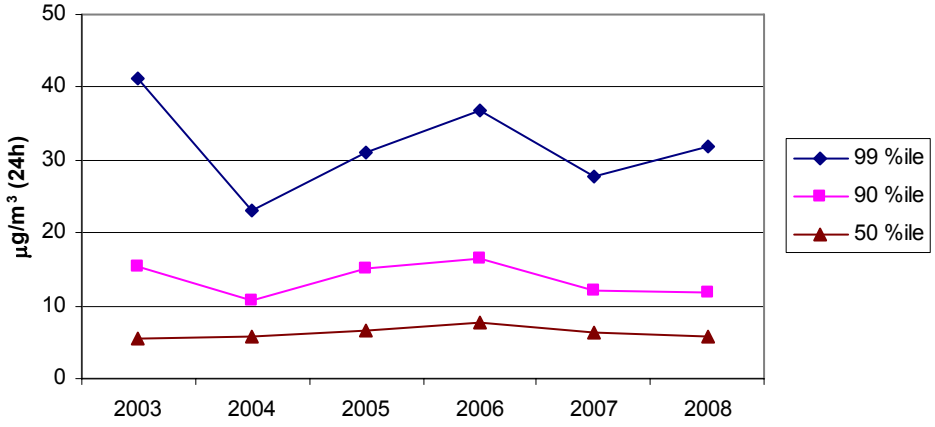

Figure 12: Percentiles of daily $PM_{2.5}$ (average of Port Phillip stations 2003-08)

Table 89: Percentiles of daily PM2.5 at Alphington (2002–08)

AAQ NEPM standard: 25 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 (μg/m³)	Percentiles (ppm) 99th	98th	95th	90th	75th	50th
2002	*33.6*	*0*	*19.3*	*17.9*	*16.6*	*11.6*	*11.0*	*8.7*	*6.0*
2003	91.8	5	**41.0**	**39.0**	**34.2**	19.2	15.5	9.1	6.0
2004	94.3	1	**27.4**	24.2	19.4	13.0	11.3	8.6	6.0
2005	94.3	3	**38.3**	**31.2**	**27.0**	19.5	16.8	9.3	7.2
2006	86.9	6	**56.4**	**36.9**	**31.0**	**25.4**	16.4	10.7	7.6
2007	95.1	3	**36.0**	**30.7**	24.7	17.1	12.6	8.9	6.5
2008	100.0	4	**46.7**	**34.5**	**32.2**	15.8	11.6	8.6	6.0

Monitoring by reference method (one-day-in-three). Years with data availability below 75 per cent shown in italics. Exceedences shown in bold.

Table 90: Percentiles of daily PM2.5 at Footscray (2002–08)

AAQ NEPM standard: 25 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 (μg/m³)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
2002	*22.1*	*0*	*10.2*	*10.2*	*10.1*	*9.6*	*8.3*	*7.2*	*4.2*
2003	80.3	3	**55.7**	**43.5**	**29.2**	22.5	15.0	8.4	5.1
2004	89.3	0	22.3	21.8	19.7	13.9	10.2	7.5	5.7
2005	81.1	2	**32.8**	**31.2**	21.3	16.8	13.5	9.0	6.1
2006	*65.6*	*2*	***36.7***	***31.4***	*22.5*	*16.6*	*14.3*	*9.4*	*6.1*
2007	95.1	1	**33.1**	24.7	22.4	17.0	11.3	8.5	6.4
2008	92.6	3	**30.5**	**29.2**	23.9	13.9	11.9	7.9	5.5

Monitoring by reference method (one-day-in-three). Years with data availability below 75 per cent shown in italics. Exceedences shown in bold.

Monitoring for the $PM_{2.5}$ Equivalence Program was conducted using TEOM instruments. Results are presented in Tables 91-93.

Table 91: PM2.5 Equivalence Program 2008 TEOM monitoring – Daily concentrations in Victoria

Region Performance monitoring station	Data availability (% of days)	Max (μg/m³)	Percentiles (μg/m³)					
			99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	99.5	**44.2**	**25.6**	19.0	12.8	9.9	6.8	4.7
Footscray	99.7	**34.5**	23.2	16.6	11.6	9.2	6.6	4.5

Table 92: Percentiles of daily TEOM PM2.5 (Equivalence Program) at Alphington (2003–08)

Year	Data availability (% of days)	Max (μg/m³)	Percentiles (μg/m³)					
			99th	98th	95th	90th	75th	50th
2003	94.2	59.5	39.2	29.9	17.9	13.7	8.3	5.6
2004	94.8	21.7	15.6	12.3	10.1	7.8	6.1	4.3
2005	93.4	24.8	17.9	16.2	14.0	11.2	6.9	4.3
2006	87.7	112.6	50.5	28.7	14.9	11.2	7.6	4.7
2007	100.0	59.4	21.7	17.9	14.3	12.0	7.5	5.0
2008	99.5	44.2	25.6	19.0	12.8	9.9	6.8	4.7

Table 93: Percentiles of daily TEOM PM2.5 (Equivalence Program) at Footscray (2003–08)

Year	Data availability (% of days)	Max (μg/m³)	Percentiles (μg/m³)					
			99th	98th	95th	90th	75th	50th
2003	*10.1*							
2004	88.5	23.8	14.1	12.5	9.9	8.2	5.8	3.8
2005	99.7	20.3	14.3	13.0	10.8	9.0	5.9	3.9
2006	91.8	95.7	44.0	23.2	15.6	11.3	6.8	4.3
2007	99.5	42.9	18.9	16.0	12.0	10.4	6.3	4.2
2008	99.7	34.5	23.2	16.6	11.6	9.2	6.6	4.5

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

Lead

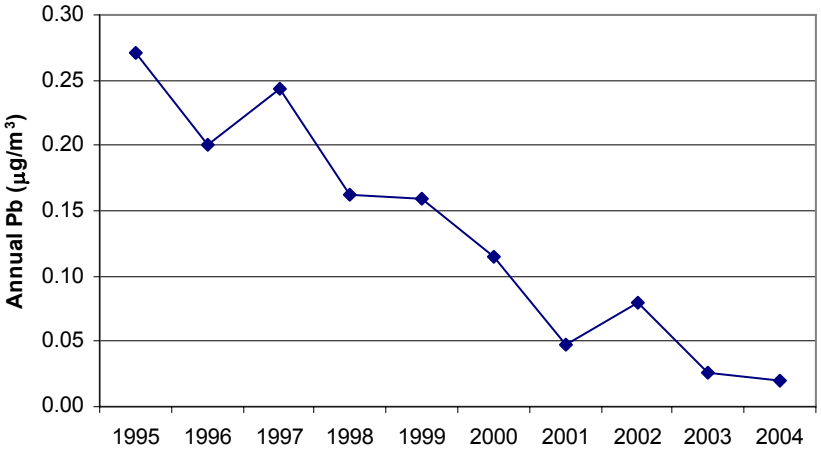

Figure 13: Annual average lead (Collingwood 1995-2004)

Table 94: Annual average lead (Collingwood 1995–2004)

AAQ NEPM standard: 0.50 µg/m³ (1-year average)

Year	Data availability (% of days)	Annual Average (µg/m³)
1995	80.5	0.27
1996	100.0	0.20
1997	100.0	0.24
1998	90.4	0.16
1999	98.6	0.16
2000	100.0	0.11
2001	92.1	0.05
2002	92.1	0.08
2003	98.6	0.03
2004	91.8	0.02