NATIONAL ENVIRONMENT PROTECTION (AMBIENT AIR QUALITY) MEASURE

NEW SOUTH WALES ANNUAL COMPLIANCE REPORT 2010

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Acronyms, abbreviations and glossary

Following is a list of acronyms, abbreviations and terms used in this report.

AAQ NEPM	Ambient Air Quality – National Environment Protection Measure
ABS	Australian Bureau of Statistics
Ambient air	The external air environment (does not include the air environment inside buildings or structures)
AQMP	Air Quality Monitoring Plan
AS	Australian Standards
BAM	Beta Attenuation Monitor
CO	Carbon monoxide
EPA	Environment Protection Authority
FDMS	Filter Dynamics Measurement System (used with TEOM)
FRM	Federal Reference Method (USEPA)
GRUB	Generally Representative Upper Bound
ICP-AES	Inductively Coupled Plasma-Atomic Emission Spectroscopy
Monitoring station	A facility for measuring the concentration of one or more pollutants in the ambient air in a region or sub-region
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
O_3	Ozone
OEH	Office of Environment and Heritage (NSW)
Pb	Lead
$PM_{2.5}$	Particulate Matter with aerodynamic diameter of 2.5 microns or less
PM_{10}	Particulate Matter with aerodynamic diameter of 10 microns or less
POEO	Protection of the Environment Operations Act (1997) – key piece of environmental protection legislation in NSW
ppm	Parts per million by volume – parts of pollutant per million parts of air
PRC	Peer Review Committee
RAAS	Reference Ambient Air Sampler
SO_2	Sulfur dioxide
TEOM	Tapered Element Oscillating Microbalance
USEPA	United States Environmental Protection Agency
$\mu g/m^3$	microgram (1 millionth of a gram) per cubic metre referenced to a temperature of 0°C and an absolute pressure of 101.325 kilopascals
VOC	Volatile Organic Compounds – compounds that vaporise, that is become a gas, at normal atmospheric temperatures

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Overview

This report, required under clause 18 of the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM), presents the results of air quality monitoring in New South Wales for the 2010 calendar year and assesses them against the requirements of the AAQ NEPM. The Office of Environment and Heritage (OEH), the department which undertakes this monitoring for the NSW State Government, also releases these data on its public website (http://www.environment.nsw.gov.au/AQMS/search.htm).

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. Recognizing 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 New South Wales' monitoring plan, AAQ NEPM Technical Papers and OEH's NATA accreditation.

Ambient Air Quality monitoring at the AAQ NEPM monitoring stations in NSW during 2010 showed no exceedences of the AAQ NEPM standards for carbon monoxide (CO), nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) (monitoring for lead ceased in 2004 due to extremely low ambient concentrations).

Exceedences of the AAQ NEPM standards and goals in the AAQ NEPM monitoring network (a sub-set of OEH's total ambient air quality monitoring network) occurred for:

- 1-hour ozone in Sydney on two calendar days;
- 4-hour ozone in Sydney on five calendar days;
- 24-hour particles (as PM_{10}) at all stations in the network (total of 10 calendar days – 7 days in rural areas) due mainly to dust storms and to a lesser extent bushfires and agricultural practices.

The number of exceedences of the PM_{10} particle standard as well as the 1 and 4 hour ozone standards recorded at monitoring sites in NSW was fairly low due to a relatively wet summer period.

NSW's ambient air quality monitoring network met with several technical challenges in 2010. A faulty air conditioner resulted in data being invalidated for short periods at the Wallsend monitoring station. Data was also invalidated due to unsuitable equipment calibrations and equipment failures at the Bringelly, Rozelle, Wallsend and Wollongong stations for short periods in 2010. As a result of these technical problems, five stations did not meet the 75% data availability criterion required in every quarter, resulting in compliance with the AAQ NEPM being "Not Demonstrated" at these sites. All technical issues have been addressed and resolved and systems revised where necessary to ensure minimal data loss.

Note on $PM_{2.5}$ data in 2010

The current approved compliance method for monitoring $PM_{2.5}$ is a non-continuous (batch), 1-day-in-3 technique that requires pre and post laboratory weighing. This introduces a significant time delay in acquiring data so jurisdictions use other continuous techniques (e.g. TEOM monitors) to provide the near real-time reporting of air quality via the web expected by the community. However, the $PM_{2.5}$ AAQ NEPM variation requires us to report all $PM_{2.5}$ data (by the compliance method and continuous) and historically, our $PM_{2.5}$ data collected by the continuous TEOM method have been reported with the internal USEPA PM_{10} equivalency factors of A = 3 and B = 1.03 (where y = A + Bx) included in the calculation.

In this year's report, the assessment of continuous TEOM $PM_{2.5}$ data in the main body of the report uses data without these PM_{10} equivalency factors applied (Table 21, Tables 124 to 134). Removing the PM_{10} equivalency factor brings NSW in line with other Australian jurisdictions and more approximates that data from the reference method specified in the $PM_{2.5}$ AAQ NEPM variation.

However, until the national $PM_{2.5}$ Equivalency Project reports its findings, and an agreed continuous methodology is agreed, all $PM_{2.5}$ data collected by TEOM in NSW will be reported with and without the internal PM_{10} equivalency factors. Thus, the Appendix (Tables A1 to A13) provides the continuous TEOM $PM_{2.5}$ data with the PM_{10} equivalency factors included.

In 2010 (using the non-adjusted continuous TEOM data), concentrations in excess of the $PM_{2.5}$ advisory 24-hour reporting standard were recorded on one day at one $PM_{2.5}$ monitoring site. Concentrations in excess of the 1-year $PM_{2.5}$ advisory reporting standard were not recorded at any of the monitoring sites.

Section A – Monitoring summary

Current AAQ NEPM Monitoring network

The NSW Ambient Air Quality NEPM Monitoring Plan (*http://www.environment.nsw.gov.au/air/nepm/index.htm*) details the monitoring that NSW performs to assess compliance with the Ambient Air Quality NEPM. The majority of monitoring occurs in the high population regions of Sydney, Newcastle and Wollongong. These regions contain over 60% of the NSW population. Campaign monitoring is also performed at a number of rural population centers.

The AAQ NEPM monitoring network is only part of an overall 24-station air monitoring network operated by the Office of Environment and Heritage (OEH). The AAQ NEPM network is designed to characterise general air quality and frequently will pick up individual pollutant events. This approach ensures that there is adequate coverage of the populated areas and of the broad differences in pollutant distribution within a region. The choice of stations in each region was made to optimise both population coverage and representation of the occurrences of higher pollutant concentrations.

NSW characterises the air quality to which the general population is exposed in a region by monitoring all air pollutants of interest at a network of trend stations. These stations capture the majority of pollution events that occur from time to time, but are supplemented by additional permanent upper bound stations at which selected pollutants only will be monitored to ensure that all major pollutant events are captured and reported.

Campaign monitoring is being undertaken in regional centres. Initial monitoring is occurring at Albury, Wagga Wagga, Bathurst and Tamworth. Data from these stations will be used to validate and review the screening measures applied to the urban centres outside the Sydney-Wollongong-Newcastle regions.

In total, the AAQ NEPM network in NSW currently monitors pollutants at 20 stations – the majority of pollutants at eight trend stations (T), selected individual pollutants at four additional permanent upper bound stations or performance stations (P), and selected pollutants on a campaign basis at a further eight stations (C) in Sydney, the lower Hunter and provincial cities (see Table 1 and Figures 1-4 for further details).

In addition NSW also maintains a number of air quality monitoring stations that are not designated for NEPM monitoring. Some stations that are designated NEPM stations for particular pollutants are not designated for other pollutants. For instance St Marys is designated as a NEPM station for ozone however nitrogen dioxide and PM_{10} are also measured at this station. Data from stations that are not designated as NEPM stations for a particular pollutant are not presented in this report.

New sites and site closures

No new sites were established or closed in the NSW AAQ NEPM monitoring network during 2010. New sites were established at Singleton and Muswellbrook in the Upper Hunter Region of HSW however the data from these sites is not included in this report.

Table 1: NSW Ambient Air Quality NEPM monitoring network

Station	Station type [1]	Year established	Number of parameters	Ozone	Nitrogen dioxide	PM_{10}	$PM_{2.5}$	Carbon monoxide	Sulfur dioxide
Sydney									
Blacktown [6]	T	1992 – 2004	5	X	X	X		X	X
Bringelly	T	1992	4	X	X	X			X
Central Coast [2]	C	To be established	4	X	X	X			X
Chullora [3] [8]	T	2003	6	X	X	X	X	X	X
Earlwood	C	1998	1				X		
Liverpool	C	1990	5	X	X	X	X	X	
Macarthur	T	2003	5	X	X	X		X	X
Oakdale	P	1996	2	X		X			
Prospect [6]	T	2007	5	X	X	X		X	X
Richmond [8]	T	1992	5	X	X	X	X		X
Rozelle	T	1978	4	X	X	X		X	
St Marys	P	1992	1	X					
Lower Hunter									
Newcastle	T	1992	5	X	X	X		X	X
Maitland [2]	T	To be established	4	X	X	X			X
Beresfield [4]	C	1993	2			X	X		
Wallsend [4]	C	1992	4	X	X		X		X
Illawarra									
Albion Park	P	1978 – 2005	4	X	X	X			X
Albion Park South	P	2005	4	X	X	X			X
Kembla Grange	P	1994	2	X		X			
Warrawong	P	1993 - 2006	1						X
Wollongong	T	1993	6	X	X	X	X	X	X
Regional NSW									
Albury	C	2000	1			X			
Bathurst [7]	C	2000	2	X		X			
Dubbo [5]	C	Dependent on campaign monitoring results	1			X			
Lismore [5]	C		1			X			
Orange [5]	C		1			X			
Tamworth	C	2000	1			X			
Wagga Wagga	C	2001	1			X			

1 P denotes performance; T denotes trend; C denotes campaign

2 Postponed – under review

3 Replaced the Lidcombe trend station

4 Data from Beresfield and Wallsend will be reported at least until the Maitland station is established

5 Monitoring subject to results from initial campaign monitoring

6 Prospect station replaces Blacktown station from 2007

7 Bathurst ozone analyzer removed in August 2007 due to the completion of the campaign

8 Both FRM and TEOM $PM_{2.5}$ monitoring was conducted at this site

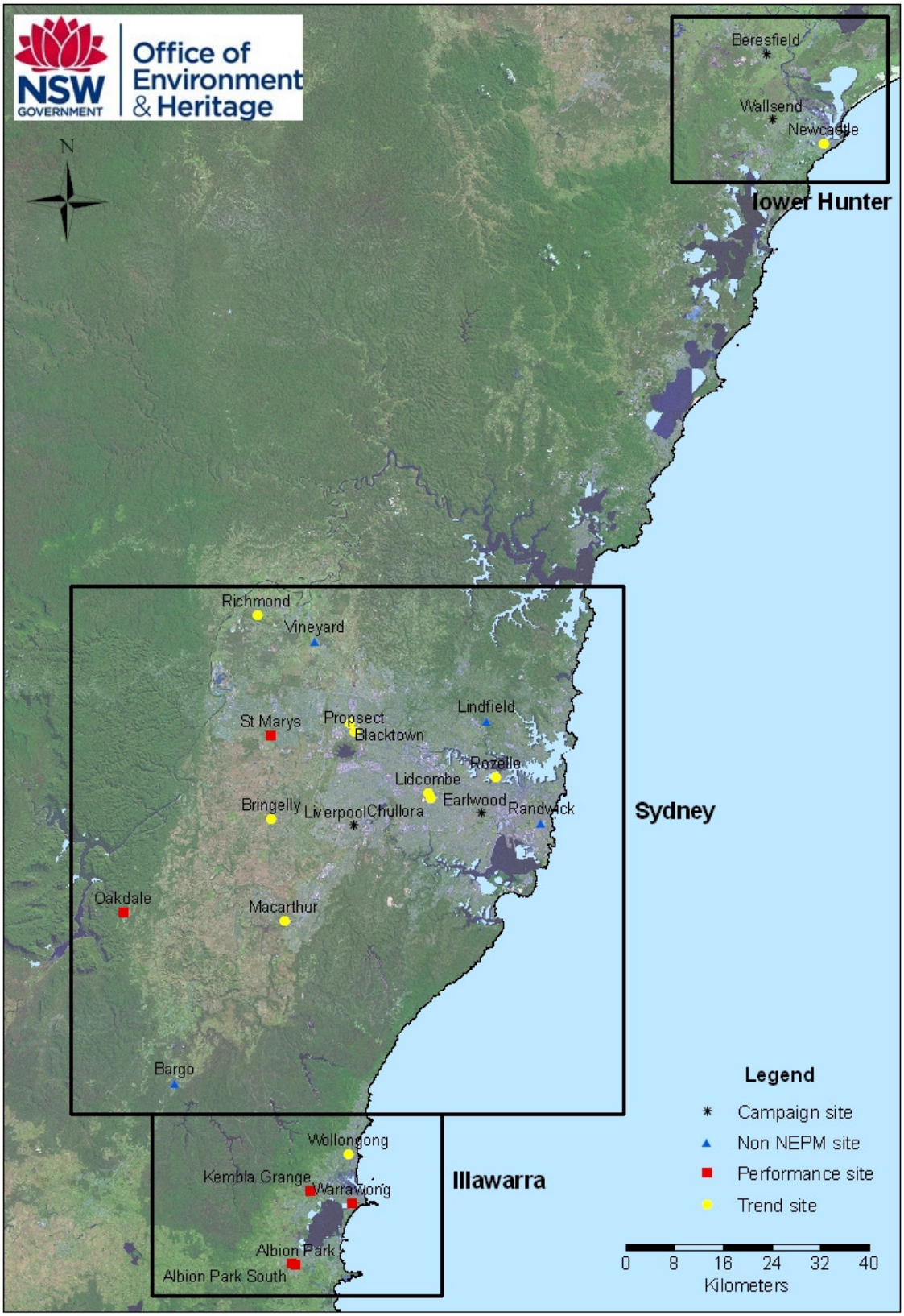

Figure 1 **Ambient Air Quality Monitoring in the Sydney, Illawarra and lower Hunter regions**

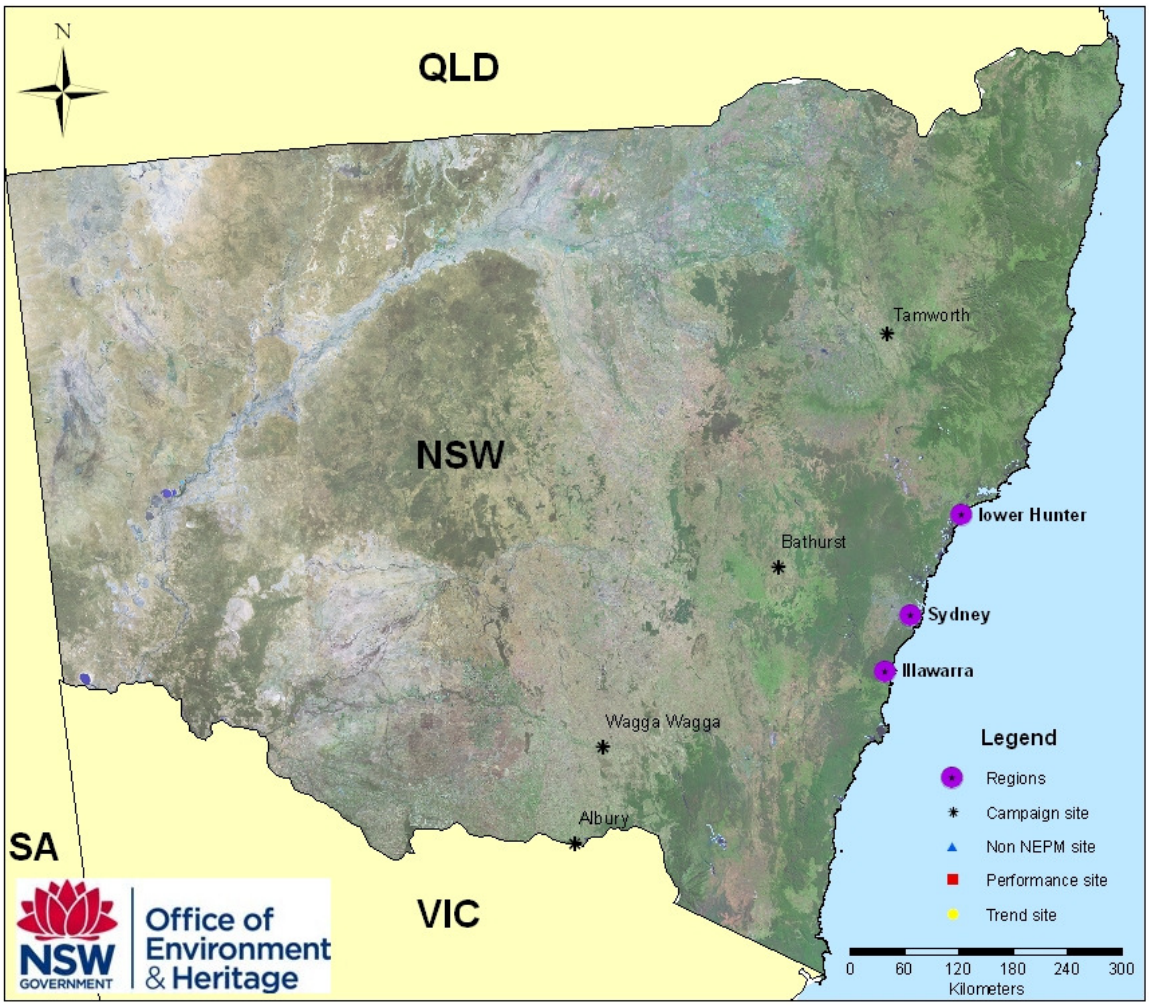

Figure 2 Ambient Air Quality Monitoring in regional New South Wales

Station siting and exposure

All stations within the network meet all of the Ambient Air Quality NEPM siting and exposure criteria with the exceptions of Earlwood, Liverpool, Rozelle, Tamworth, and Wagga Wagga (see Table 2 for further details).

Table 2: Stations not complying with all siting and exposure criteria

Station	Siting criteria not met	Comments
Earlwood	Clear sky angle <120°. Less than 20m from trees.	Trees have grown since establishment of station.
Liverpool	Clear sky angle <120°.	Trees have grown since establishment of station.
Rozelle	Clear sky angle <120°. Less than 20m from trees.	Trees have grown since establishment of station.
Tamworth	Less than 20m from trees.	Best location in urban area specifically targeted for monitoring.
Wagga Wagga	Less than 20m from trees.	Street trees within about 15 m of station

Monitoring methods

The NSW network is comprised of instruments that are in accordance with the relevant Australian standard (See Table 3 for further details). It will be noted that, in the case of PM_{10}, the Tapered Element Oscillating Microbalance (TEOM) method is used for NEPM monitoring and reporting. PM_{10} data from the TEOM are presented as measured and unadjusted for temperature.

Table 3: Instruments used in NSW for NEPM monitoring

Pollutant	Standard	Title	Method used
Carbon monoxide	AS3580.7.1-1992	Ambient Air - Determination of Carbon Monoxide - Direct Reading Instrument Method	Gas Filter Correlation /Infra-Red
Nitrogen dioxide	AS3580.5.1-1993	Ambient Air - Determination of Oxides of Nitrogen - Chemiluminescence Method	Gas Phase Chemi-luminescence
Photochemical oxidant (ozone)	AS3580.6.1-1990	Ambient Air - Determination of Ozone - Direct Reading Instrument Method	Non Dispersive Ultra-violet
Sulfur dioxide	AS3580.4.1-1990	Ambient Air - Determination of Sulfur Dioxide - Direct Reading Instrument Method	Pulsed Fluorescence
Lead [+]	AS2800 -1985	Ambient Air - Determination of Particulate Lead-High Volume Sampler - Gravimetric Method	Atomic Absorption
Particles as PM_{10}	AS 3580.9.8-2001	Determination of Suspended particulate matter - PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser.	Tapered Element Oscillating Microbalance (TEOM)
Particles as $PM_{2.5}$	AS3580.9.8 -2001*	Technical Paper on Monitoring for Particles as $PM_{2.5}$	Tapered Element Oscillating Microbalance (TEOM)
			Partisol[#]
			Reference Ambient Air Samplers (RAAS)[#]

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

[+] No longer measured in New South Wales

[#] Both the Partisol and RAAS instruments are considered Federal Reference Methods (FRM)

NATA accreditation

As required under Clause 12 of the Ambient Air Quality NEPM, the OEH is accredited by the National Association of Testing Authorities (NATA) for the measurement of all Ambient Air Quality NEPM parameters. The biennial reassessment of the Air Quality Monitoring Laboratory and

associated monitoring stations by NATA was completed in late 2010 and accreditation has been continued.

Pollutant screening criteria

Clause 14(2) of NEPM allows for fewer performance monitoring stations where it can be demonstrated that pollutant levels are reasonably expected to be consistently lower than the AAQ NEPM standards. These screening criteria have been used for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, and lead, at several regions in NSW. More detailed information regarding screening of pollutants for specific regions is given in the NSW Monitoring Plan, available on the OEH website (*http://www.environment.nsw.gov.au/air/nepm/index.htm*)

Section B – Assessment of compliance with standards and goals

Air quality is assessed against the Ambient Air Quality (AAQ) NEPM standards and goals as specified in Schedule 2 of the NEPM and reproduced below in Table 4.

The **Standards** against which air quality is assessed are concentrations in parts per million (ppm) or micrograms per cubic metre ($\mu g/m^3$) – (see column 3 of Table 4.)

The **Goal** of the AAQ NEPM is to achieve the Standards as assessed in accordance with the monitoring protocol within 10 years of commencement (i.e. 2008) to the extent specified in Schedule 2 of the NEPM. The extent is expressed as a maximum allowable number of exceedances for each standard (see column 4 in Table 4). These are set to account for unusual meteorological conditions and, in the case of particles, natural events such as dust storms and bushfires, that can't be controlled through normal air quality management programs.

The AAQ NEPM also specifies advisory reporting standards for $PM_{2.5}$ (see Table 4). The goal for $PM_{2.5}$ is to collect sufficient data to facilitate a review of the $PM_{2.5}$ standards.

Table 4: NEPM Standards and Goals

Pollutant	Averaging period	AAQ NEPM Standard maximum concentration	AAQ NEPM Goal. maximum number of allowable exceedances
Carbon monoxide	8 hour rolling average	9.0 ppm	1 day a year
Nitrogen dioxide	1 hour average	0.12 ppm	1 day a year
	1 year average	0.03 ppm	None
Photochemical oxidants – as ozone	1 hour average	0.10 ppm	1 day a year
	4 hour rolling average	0.08 ppm	1 day a year
Sulfur dioxide	1 hour average	0.20 ppm	1 day a year
	1 day average	0.08 ppm	1 day a year
	1 year average	0.02 ppm	None
Particles as PM_{10}	1 day average	50 $\mu g/m^3$	5 days a year
Lead	1 day average	0.50 $\mu g/m^3$	None
Particles as $PM_{2.5}$ [#]	1 day average	25 $\mu g/m^3$	Gather sufficient data nationally to facilitate a review of Advisory Reporting Standard.
	1 year average	8 $\mu g/m^3$	

[#] - Reporting standard only.

The following tables summarise compliance with the standards and goals of the AAQ NEPM. For each pollutant, the data availability (quarterly and annual), the number of days when standards were exceeded, the annual mean (where an annual standard exists) and an assessment of compliance, are given for each monitoring station within each region.

A station's performance is assessed as **complying with the NEPM (i.e. 'MET')** if the number of exceedances is no more than the number specified in Schedule 2 of the AAQ NEPM and data availability was at least 75% in each quarter of 2010. A region demonstrates compliance with the NEPM when either all stations in the region demonstrate compliance, or when the region meets approved *pollutant screening criteria*.

A station's performance is assessed as **not complying with the NEPM (i.e.'NOT MET')** if there is more than the number of exceedances specified in Schedule 2 of the AAQ NEPM, even if the data availability rates are less than the 75% required.

A station's performance is assessed as **'NOT DEMONSTRATED' (ND)** if it records no exceedances, or exceedances on a number of days less than that allowed, but has data availability rates less than 75% in any quarter. This may be due to instrument failures, temporary closures for upgrading or closures to allow relocation of the station.

These categories (i.e. MET, NOT MET and ND) are used in the tables on the following pages.

Calculation and reporting methods used comply with the requirements detailed in the NEPC Peer Review Committee Technical paper No 8: Annual Reports (NEPC 2002). Previous reports included daily average calculations for PM_{10}, $PM_{2.5}$ and sulfur dioxide using hours 0 to 23 – daily averages are now calculated using hours 1 to 24 as detailed in the NEPM Technical Paper No.5, "Data Collection and Handling". There are also some minor differences in the data included in this year's report when compared to previous year's reports due to the way the NSW OEH's new air quality database performs its internal calculations, especially in relation to percentiles.

PM_{10} TEOM data indicate data which has undergone an internal correction factor for USEPA equivalency but without subsequent treatment or temperature adjustment.

$PM_{2.5}$ TEOM data indicate data which has not undergone an internal correction for USEPA PM_{10} equivalency or any subsequent treatment or adjustment for temperature.

All days where a particular standard for a pollutant has been exceeded are listed. Also listed are the stations that recorded an exceedance of the standard on that day, and for averaging periods less than twenty-four hours, the number of averaging periods in the day that the standard was exceeded.

Where possible, a brief comment is given for particular pollution events. Events that have been clearly influenced by extraordinary natural events, such as bushfires and dust storms, are highlighted. It should be noted that the absence of a comment does not necessarily indicate the absence of such influences, rather that there is no clear information available. In some cases it is likely that there has been some influence, but the extent of this influence cannot be absolutely determined.

Data loss

Detailed below are the reasons why the data availability rates are lower then the Ambient Air Quality NEPM goal for 2010 for the following ambient air pollutants:

Technical issues resulted in data losses for the following pollutants and sites during 2010:

- Carbon monoxide at Newcastle
- Nitrogen dioxide at Prospect, Rozelle, Wollongong and Wallsend.
- Sulfur dioxide at Bringelly and Wallsend.

Carbon monoxide

Table 5: 2010 compliance summary for CO in New South Wales

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedances (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
						AAQ NEPM Standard 9.0 ppm (8-hour average)	
Sydney							
Chullora	94.7	91.0	94.4	92.8	93.2	0	Met
Liverpool	92.4	95.4	93.8	95.1	94.2	0	Met
Macarthur	84.9	93.5	94.1	95.4	92.0	0	Met
Prospect	83.7	87.6	90.8	91.5	88.4	0	Met
Rozelle	76.0	90.6	88.6	92.5	87.0	0	Met
Illawarra							
Wollongong	93.6	93.7	94.0	92.8	93.5	0	Met
lower Hunter							
Newcastle	89.1	88.9	54.3	90.8	80.7	0	ND

ND Not demonstrated.

Bold font indicates values that exceed the AAQ NEPM standard

During 2010 no exceedances of the carbon monoxide standard were recorded in NSW. Compliance with the Ambient Air Quality NEPM goal was demonstrated in the Sydney and Illawarra regions and however not in the lower Hunter.

Nitrogen dioxide

Table 6: 2010 compliance summary for NO_2 in New South Wales

AAQ NEPM standard
0.12 ppm (1-hour average)
0.03 ppm (1-year average)

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of Exceed-ences (days)	Annual mean (ppm)	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual			1-hour	1-year
Sydney									
Bringelly	83.0	88.2	89.1	88.9	87.3	0	0.005	Met	Met
Chullora	85.6	88.4	82.5	90.6	86.8	0	0.013	Met	Met
Liverpool	92.4	93.8	92.7	89.1	92.0	0	0.011	Met	Met
Macarthur	77.2	94.7	94.3	95.0	90.4	0	0.009	Met	Met
Prospect	68.9	89.6	78.1	91.1	82.0	0	0.012	ND	ND
Richmond	93.3	91.3	75.2	92.0	87.9	0	0.005	Met	Met
Rozelle	89.9	84.7	82.1	62.1	79.6	0	0.011	ND	ND
Illawarra									
Albion Park Sth	83.6	88.0	90.8	87.5	87.5	0	0.003	Met	Met
Wollongong	68.2	93.7	93.9	92.2	87.1	0	0.009	ND	ND
lower Hunter									
Newcastle	76.6	91.3	89.7	85.7	85.9	0	0.008	Met	Met
Wallsend	74.1	93.2	91.0	85.7	86.1	0	0.009	ND	ND

ND Not demonstrated.

Bold font indicates values that exceed the AAQ NEPM standard

No exceedances of the nitrogen dioxide 1-hour and annual standards were recorded in NSW during 2010. However, compliance with the Ambient Air Quality NEPM goal was not demonstrated in each of the three regions due to low data availability rates in some quarters.

Ozone

Table 7: 2010 compliance summary for O_3 in New South Wales

AAQ NEPM standard
0.10 ppm (1-hour average)
0.08 ppm (4-hour average)

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedances (days)		Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual	1-hour	4-hour	1-hour	4-hour
Sydney									
Bringelly	89.0	87.2	89.2	91.3	89.2	**2**	**3**	Not Met	Not Met
Chullora	93.7	91.0	94.4	92.8	93.0	0	0	Met	Met
Liverpool	92.5	95.4	93.8	95.1	94.2	0	1	Met	Met
Macarthur	90.4	95.1	94.5	95.5	93.9	1	1	Met	Met
Oakdale	95.0	93.1	93.2	95.3	94.2	0	**2**	Met	Not Met
Prospect	83.7	89.7	90.0	91.5	88.7	**2**	**2**	Not Met	Not Met
Richmond	93.3	91.3	93.2	95.2	93.2	0	1	Met	Met
Rozelle	90.4	83.7	89.5	92.6	89.1	0	0	Met	Met
St Marys	92.3	94.6	95.3	91.8	93.5	0	1	Met	Met
Illawarra									
Albion Park Sth	91.0	89.2	91.2	89.7	90.3	0	0	Met	Met
Kembla Grange	89.4	91.1	85.1	93.2	89.7	0	0	Met	Met
Wollongong	93.7	93.7	87.0	92.8	91.8	0	0	Met	Met
lower Hunter									
Newcastle	85.7	91.3	88.5	90.8	89.1	0	0	Met	Met
Wallsend	78.3	92.7	91.7	90.5	88.3	0	0	Met	Met

ND Not demonstrated.

Bold font indicates values that exceed the AAQ NEPM standard

Both the 1-hour and 4-hour standards for ozone were exceeded only in the Sydney region during 2010. The Sydney region did not comply with the Ambient Air Quality NEPM goal, while compliance was demonstrated in the Illawarra and lower Hunter regions.

Sulfur dioxide

Table 8: 2010 compliance summary for SO_2 in New South Wales

AAQ NEPM standards
0.20 ppm (1-hour average)
0.08 ppm (24-hour average)
0.02 ppm (1-year average)

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedances (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
Sydney											
Bringelly	70.5	76.2	81.8	90.8	79.9	0	0	0.000	ND	ND	ND
Chullora	91.6	91.0	94.4	90.7	91.9	0	0	0.001	Met	Met	Met
Macarthur	86.7	95.0	94.5	95.5	92.9	0	0	0.000	Met	Met	Met
Prospect	83.6	89.6	91.0	91.5	88.9	0	0	0.001	Met	Met	Met
Richmond	93.2	91.3	93.5	95.2	93.3	0	0	0.000	Met	Met	Met
Illawarra											
Albion Park Sth	90.8	88.6	91.1	87.6	89.6	0	0	0.001	Met	Met	Met
Wollongong	92.5	92.6	78.4	90.1	88.4	0	0	0.001	Met	Met	Met
lower Hunter											
Newcastle	82.0	91.2	78.6	86.6	84.6	0	0	0.001	Met	Met	Met
Wallsend	64.8	93.3	78.2	45.2	70.3	0	0	0.001	ND	ND	ND

ND Not demonstrated.

Bold font indicates values that exceed the AAQ NEPM standard

The 1-hour, 24-hour and annual standards for sulfur dioxide were not exceeded in NSW during 2010. Compliance with the Ambient Air Quality NEPM goal was met throughout the Illawarra region however it was not demonstrated in the Sydney and lower Hunter regions due to low data availability rates in Q1 and Q4.

Particles as PM_{10}

Table 9: 2010 compliance summary for PM_{10} in New South Wales

Region/ Performance monitoring Station	Data availability rates (% of days)					Number of exceedances (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
						AAQ NEPM Standard 50 µg/m^3 (24-hour average)	
Sydney							
Bringelly	96.7	94.5	100.0	97.8	97.3	0	Met
Chullora	100.0	95.6	98.9	100.0	98.6	0	Met
Liverpool	96.7	100.0	95.7	96.7	97.3	0	Met
Macarthur	100.0	100.0	97.8	100.0	99.5	1	Met
Oakdale	100.0	100.0	100.0	97.8	99.5	0	Met
Prospect	92.2	97.8	100.0	100.0	97.5	0	Met
Richmond	93.3	95.6	97.8	97.8	96.2	0	Met
Rozelle	98.9	100.0	96.7	100.0	98.9	0	Met
Illawarra							
Albion Park Sth	95.6	100.0	91.3	100.0	96.7	0	Met
Kembla Grange	97.8	100.0	96.7	100.0	98.6	0	Met
Wollongong	91.1	98.9	93.5	96.7	95.1	0	Met
lower Hunter							
Beresfield	94.4	97.8	98.9	96.7	97.0	0	Met
Newcastle	85.6	100.0	100.0	98.9	96.2	1	Met
Regional							
Albury	100.0	100.0	97.8	100.0	99.5	2	Met
Bathurst	100.0	97.8	96.7	100.0	98.6	0	Met
Tamworth	98.9	96.7	100.0	97.8	98.4	0	Met
Wagga Wagga	91.1	98.9	97.8	100.0	97.0	**6**	Not Met

ND Not demonstrated.

Bold font indicates values that exceed the AAQ NEPM standard

The PM_{10} standard was exceeded in many regions of NSW during 2010, with all of the regions in NSW complying with the Ambient Air Quality NEPM except for the regional site at Wagga Wagga.

Particles as $PM_{2.5}$

Table 10: Summary of $PM_{2.5}$ concentrations in NSW (2010) – continuous TEOM method

Advisory Reporting Standard
25 µg/m^3 (24-hour average)
8 µg/m^3 (Annual average)

Region/ Performance monitoring station	Data availability rates (% of hours) Q1	Q2	Q3	Q4	Annual	Days above ARS	Annual mean (µg/m^3)
Sydney							
Chullora	80.0	94.5	98.9	100.0	93.4	0	5.7
Earlwood	95.7	91.3	97.0	95.6	94.9	0	5.6
Liverpool	92.3	96.9	94.2	95.4	94.7	0	6.3
Richmond	97.8	93.4	97.8	98.9	97.0	0	4.2
Illawarra							
Wollongong	92.8	95.8	84.9	95.2	92.1	0	5.0
lower Hunter							
Beresfield	93.0	97.0	96.6	95.9	95.7	1	5.9
Wallsend	81.8	96.5	97.5	95.6	92.9	0	4.6

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=1.00 and B=0

In 2010, the Sydney, lower Hunter and Illawarra regions all complied with the advisory reporting standard with an annual average below 8.0 µg/m^3.

Table 11: Summary of $PM_{2.5}$ equivalency study concentrations in NSW (2010) – FRM method

Advisory Reporting Standard
25 µg/m^3 (24-hour average)
8 µg/m^3 (Annual average)

Region/ Performance monitoring station	Data availability rates * (no of valid samples) Q1	Q2	Q3	Q4	Annual	Days above ARS	Annual mean (µg/m^3)
Sydney							
Chullora	90.0	84.6	78.8	82.1	83.8	1	6.5

* Please note that the data availability rates are based on a one day in three sampling regime.

** Please note that sampling at the Richmond site ceased at the end of 2007

*** Please note that sampling at Chullora was not conducted between the 15th - 30th Dec due to technical problems

Lead

Changes to fuel formulation have brought marked reductions in the levels of lead in the atmosphere. Annual averages throughout New South Wales are now typically less than 0.03µg/m^3 with many 24-hour average samples below the minimum detection limit for lead of 0.007µg/m^3 using ICP-AES (Inductively Coupled Plasma-Atomic Emission Spectroscopy) analysis. Since 2002 the highest annual average recorded in New South Wales was 0.09µg/m^3 at Wallsend during 2003, only 18% of the standard.

With a complete ban on lead in petrol now in force, the primary source of lead in air at the regional scale has been eliminated.

The Office of Environment and Heritage began phasing out ambient lead monitoring for the AAQ NEPM during 2004. All lead monitoring ceased from 1st January 2005.

A report summarising the case for a cessation of lead monitoring was presented to NEPC and can be found on the EPHC website.

Section C – Analysis of air quality

Data availability rate

Throughout this report data availability rates are presented as either percentages of available data, or as days available. These two rates are calculated using different methods. When presented as a percentage, the value is the number of averaging periods where data is valid, divided by the total number of averaging periods in the year. When presented as number of valid days, this value represents the number of days during the year when at least seventy-five percent of averaging periods during the day are valid.

For example the carbon monoxide standard is based on eight hour rolling averages. A valid hour (the end point of an eight hour average) is the average, over the preceding eight hours, of the valid one-hour averages, when at least six of those hours hold valid data. A valid day has at least eighteen valid hours. If we hypothesize that on each day throughout the year we had *exactly* eighteen valid hours, then annual data availability would be seventy-five percent. The number of valid days would be 365.

For the gaseous pollutants, carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide, the NSW OEH undertakes a daily automated instrument calibration check. This occurs during the early hours of the morning, and sample data obtained during the calibration check is considered as invalid data. Hence for these pollutants the maximum number of valid one-hour averages in a day is twenty-three. All calculations for data availability given in this report *include* the invalid calibration hour (i.e. calculations assume that there are twenty-four *possible* valid hours in a day). Therefore for these pollutants the maximum that the annual one-hour data availability can be is 95.8 %.

For a pollutant that is reported against more than one standard, data availability rates may not be the same for each standard. For instance when measuring ozone, one hour of each day is lost during instrument calibration checks. This affects the data availability rates when reporting against the one hour standard but does not affect data availability rates when reporting against the four hour standard. The maximum data availability rates are thus 95.8% and 100% respectively.

For compliance reporting on standards with averaging periods less than twenty-four hours, peak daily values are given regardless of the number of valid hours in that day. For reporting of statistics, such as percentiles of daily maxima, on standards with averaging periods less than twenty-four hours, only days that have at least seventy-five percent of valid hours are used.

Carbon monoxide

Table 11: Summary for CO - Daily maximum rolling 8-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Chullora	97.8	354	2.3	28/07/2010 03:00	1.9	04/05/2010 03:00
Liverpool	98.6	356	2.1	17/06/2010 02:00	2.0	13/07/2010 02:00
Macarthur	96.1	347	0.9	11/07/2010 02:00	0.9	09/06/2010 02:00
Prospect	95.8	343	1.9	30/06/2010 03:00	1.7	29/06/2010 03:00
Rozelle	93.6	332	1.8	28/07/2010 05:00	1.8	25/05/2010 03:00
Illawarra						
Wollongong	98.4	356	1.5	13/01/2010 15:00	1.4	07/02/2010 20:00
lower Hunter						
Newcastle	87.5	310	1.4	09/06/2010 02:00	1.3	16/06/2010 03:00

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Carbon monoxide levels are well below the Ambient Air Quality NEPM standard. The highest recorded value in the state was 2.3ppm (Chullora). This is only 26 per cent of the standard. Levels in all regions are significantly lower than the NEPM standard.

Nitrogen dioxide

Table 12: Summary for NO_2 - Daily maximum 1-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	87.3	347	0.037	22/04/2010 20:00	0.030	20/01/2010 24:00
Chullora	86.8	319	0.057	23/04/2010 20:00	0.045	25/09/2010 19:00
Liverpool	92.0	350	0.053	23/04/2010 20:00	0.048	22/04/2010 20:00
Macarthur	90.4	344	0.042	19/01/2010 22:00	0.040	21/01/2010 04:00
Prospect	82.0	322	0.043	19/03/2010 22:00	0.041	20/03/2010 01:00
Richmond	87.9	332	0.033	23/04/2010 20:00	0.026	07/05/2010 18:00
Rozelle	79.6	304	0.049	02/05/2010 19:00	0.040	22/04/2010 19:00
Illawarra						
Albion Park Sth	87.5	343	0.041	22/04/2010 18:00	0.037	22/02/2010 19:00
Wollongong	87.1	317	0.052	23/04/2010 19:00	0.050	10/04/2010 19:00
lower Hunter						
Newcastle	85.9	341	0.038	01/09/2010 21:00	0.037	25/09/2010 21:00
Wallsend	86.1	335	0.038	24/09/2010 18:00	0.036	08/05/2010 19:00

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Within NSW levels of nitrogen dioxide are well below the NEPM standard. The highest recorded 1-hour average value in the state was 0.057ppm (48 per cent of the standard) at the Chullora station. The highest annual average of 0.013ppm (43 percent of the standard) was recorded at Chullora.

Ozone

Table 13: Summary for O_3 - Daily maximum 1-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	89.2	355	**0.104**	20/03/2010 17:00	**0.101**	12/01/2010 16:00
Chullora	93.0	354	0.083	20/03/2010 16:00	0.077	09/01/2010 16:00
Liverpool	94.2	359	0.091	12/01/2010 14:00	0.087	20/03/2010 17:00
Macarthur	93.9	357	**0.119**	12/01/2010 16:00	0.094	21/01/2010 16:00
Oakdale	94.2	359	0.099	20/03/2010 19:00	0.094	12/01/2010 19:00
Prospect	88.7	351	**0.104**	12/01/2010 18:00	**0.104**	20/03/2010 16:00
Richmond	93.2	356	0.089	10/01/2010 12:00	0.082	30/12/2010 14:00
Rozelle	89.1	350	0.073	21/03/2010 13:00	0.070	09/01/2010 12:00
St Marys	93.5	354	0.095	20/03/2010 17:00	0.087	26/01/2010 15:00
Illawarra						
Albion Park Sth	90.3	360	0.093	22/01/2010 14:00	0.081	09/01/2010 14:00
Kembla Grange	89.7	354	0.081	22/01/2010 14:00	0.079	09/01/2010 16:00
Wollongong	91.8	354	0.082	20/01/2010 19:00	0.072	26/03/2010 16:00
lower Hunter						
Newcastle	89.1	354	0.086	21/01/2010 17:00	0.073	21/03/2010 14:00
Wallsend	88.3	343	0.067	09/01/2010 14:00	0.067	10/01/2010 12:00

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 14: Summary for O_3 - Daily maximum rolling 4-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	85.2	349	**0.089**	12/01/2010 19:00	**0.085**	26/01/2010 17:00
Chullora	96.2	355	0.072	20/03/2010 18:00	0.071	09/01/2010 18:00
Liverpool	98.3	359	**0.081**	12/01/2010 16:00	0.074	26/01/2010 16:00
Macarthur	98.0	357	**0.103**	12/01/2010 17:00	0.080	31/12/2010 16:00
Oakdale	98.4	359	**0.088**	20/03/2010 21:00	**0.084**	12/01/2010 19:00
Prospect	85.9	349	**0.097**	12/01/2010 19:00	**0.087**	20/03/2010 18:00
Richmond	97.3	355	**0.082**	10/01/2010 13:00	0.069	27/03/2010 16:00
Rozelle	86.8	347	0.067	21/03/2010 14:00	0.064	09/01/2010 15:00
St Marys	97.8	354	**0.083**	26/01/2010 17:00	0.079	20/03/2010 19:00
Illawarra						
Albion Park Sth	86.2	356	0.073	22/01/2010 15:00	0.068	09/01/2010 16:00
Kembla Grange	86.7	351	0.078	09/01/2010 17:00	0.068	22/01/2010 15:00
Wollongong	94.9	354	0.073	20/01/2010 20:00	0.066	26/03/2010 18:00
lower Hunter						
Newcastle	85.1	346	0.076	21/01/2010 19:00	0.065	10/01/2010 13:00
Wallsend	88.2	339	0.063	10/01/2010 15:00	0.062	21/03/2010 16:00

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Ozone events in the Sydney and Illawarra regions are highly variable in terms of both frequency and severity. This is largely the result of the annual variability of meteorological conditions, which has the greatest effect on measures of frequency but can also have some influence on measures of peak concentrations. In the Sydney region emissions of ozone precursors (NOx and VOCs) are sufficient to generate concentrations of ozone well above the Ambient Air Quality NEPM standards (EPA 2003).

Both the 1-hour and 4-hour NEPM standards were exceeded in the Sydney region. There were no exceedances of either standard in the Illawarra or lower Hunter.

The 1-hour standard was exceeded at three Sydney monitoring stations: Bringelly, Macarthur and Prospect. Bringelly and Prospect both recorded the highest number of exceedances with two days where hourly averages were greater than the standard. The maximum 1-hour average during the year was 0.119 ppm recorded at Macarthur on the 12th January.

Table 15: Days when O_3 1-hour Ambient Air Quality NEPM standard exceeded

Date	Stations where standard exceeded (and hour number/s where concentration exceeding standard)	Comments(#)
12 Jan 2010	Prospect, Macarthur, Bringelly	
20 Mar 2010	Prospect, Bringelly	

(#) Events that can be clearly identified as influencing pollution levels

Table 16: Days when O_3 4-hour Ambient Air Quality NEPM standard exceeded

Date	Stations where standard exceeded (and the hour number/s where concentration exceeding standard)	Comments(#)
10 Jan 2010	Richmond	
12 Jan 2010	Liverpool, Prospect, Macarthur, Oakdale, Bringelly	
26 Jan 2010	Bringelly, St Marys	
20 Mar 2010	Prospect, Oakdale, Bringelly,	

(#) Events that can be clearly identified as influencing pollution levels

The 4-hour standard was exceeded at most stations in the Sydney region. Seven stations in Sydney (Bringelly, Liverpool, Macarthur, Oakdale, Prospect, Richmond and St Marys) exceeded the standard, with Bringelly recording a maximum of three exceedence days. The maximum value recorded in Sydney was 0.103ppm at Macarthur on the 12th January.

Action for Air, the Air Quality Management Plan for Sydney, the Lower Hunter and the Illawarra, sets out measures to support NSW meeting AAQ NEPM goals, including to address exceedances of goals for ground level ozone. The Plan covers actions to reduce ozone precursor emissions from industry, motor vehicles and domestic/commercial sources. Key NSW measures to reduce ground level ozone formation include limiting the volatility of petrol in summer and regulating to expand Stage 1 petrol vapour recovery (from underground tanks) and commence Stage 2 vapour recovery (when cars are refuelled at service stations) from July 2010. New technology is required to be installed at the largest service stations in the GMR by 2014 and at all but the smallest service stations in Sydney by 2017. NSW is also supporting the development of national approaches to reduce ozone precursor emissions from small engines, non-road engines and surface coatings.

Sulfur dioxide

Table 17: Summary for SO_2 - Daily maximum 1-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	79.9	313	0.008	20/03/2010 18:00	0.006	25/11/2010 12:00
Chullora	91.9	350	0.021	11/02/2010 11:00	0.015	25/06/2010 12:00
Macarthur	92.9	354	0.010	12/01/2010 20:00	0.006	06/04/2010 12:00
Prospect	88.9	352	0.018	20/03/2010 21:00	0.015	15/12/2010 23:00
Richmond	93.3	356	0.009	15/12/2010 22:00	0.008	21/01/2010 19:00
Illawarra						
Albion Park Sth	89.6	357	0.032	08/03/2010 13:00	0.029	21/02/2010 20:00
Wollongong	88.4	339	0.027	13/01/2010 14:00	0.022	16/12/2010 11:00
lower Hunter						
Newcastle	84.6	335	0.027	09/09/2010 10:00	0.025	24/04/2010 24:00
Wallsend	70.3	271	0.031	29/12/2010 08:00	0.023	01/06/2010 17:00

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 18: Summary for SO_2 - Maximum 24-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Bringelly	85.8	313	0.002	26/11/2010	0.002	12/01/2010
Chullora	95.9	350	0.004	26/11/2010	0.004	22/10/2010
Macarthur	97.0	354	0.003	12/01/2010	0.003	26/11/2010
Prospect	96.4	352	0.004	21/02/2010	0.003	20/03/2010
Richmond	97.5	356	0.002	07/03/2010	0.002	09/11/2010
Illawarra						
Albion Park Sth	97.8	357	0.011	08/03/2010	0.011	09/01/2010
Wollongong	92.9	339	0.008	13/01/2010	0.006	27/12/2010
lower Hunter						
Newcastle	91.8	335	0.005	24/04/2010	0.005	25/06/2010
Wallsend	74.2	271	0.007	01/06/2010	0.005	07/07/2010

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

SO_2 levels are significantly below the 1-hour, 24-hour and annual NEPM standards. Albion Park South recorded the highest 1-hour value with 0.032 ppm (16 percent of the standard). The highest 24-hour average was recorded at Albion Park, 0.011 ppm (15 percent of the standard). The highest annual average of 0.001 ppm, which is just 5 percent of the standard, was measured at Chullora, Prospect, Albion Park Sth, Wollongong, Newcastle and Wallsend.

Particles as PM_{10}

Table 19: Summary for PM_{10} – Maximum 24-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (µg/m^3)			
			Highest Value	Highest Date	6th Highest Value	6th Highest Date
Sydney						
Bringelly	97.3	355	41.1	26/03/2010	36.4	21/01/2010
Chullora	98.6	360	42.1	27/11/2010	37.0	20/03/2010
Liverpool	97.3	355	41.1	27/11/2010	33.3	21/03/2010
Macarthur	99.5	363	**58.7**	12/01/2010	31.6	22/01/2010
Oakdale	99.5	363	33.3	27/03/2010	28.7	24/03/2010
Prospect	97.5	356	40.1	27/03/2010	30.5	17/05/2010
Richmond	96.2	351	37.0	27/03/2010	27.7	24/03/2010
Rozelle	98.9	361	37.6	27/03/2010	29.9	23/01/2010
Illawarra						
Albion Park Sth	96.7	353	41.8	09/01/2010	35.8	31/10/2010
Kembla Grange	98.6	360	47.5	12/01/2010	41.0	22/04/2010
Wollongong	95.1	347	49.6	14/11/2010	41.0	13/11/2010
lower Hunter						
Beresfield	97.0	354	50.0	21/01/2010	36.1	23/01/2010
Newcastle	96.2	351	**57.1**	21/01/2010	37.1	01/09/2010
Regional						
Albury	99.5	363	**60.8**	26/03/2010	39.8	23/01/2010
Bathurst	98.6	360	43.3	13/01/2010	28.1	23/04/2010
Tamworth	98.4	359	29.1	01/09/2010	25.3	26/03/2010
Wagga Wagga	97.0	354	**64.9**	24/03/2010	51.1	21/05/2010

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

In Sydney, exceedances of the standard were observed on only one day throughout the year. This exceedence was recorded at Macarthur on the 12th January 2010 with a concentration of 58.7µg/m^3.

The Ambient Air Quality NEPM standard was not exceeded on any days in the Illawarra region during 2010.

In the lower Hunter region the standard was exceeded on only one day in 2010, with this highest concentration of 57.1 µg/m^3 recorded at Newcastle on the 21st January.

PM_{10} levels in regional centres are influenced by dust events, agricultural activities and the use of solid fuel heaters. The highest PM_{10} level recorded in NSW during 2010 was 64.9µg/m^3 at Wagga Wagga on the 24th March. Elevated PM_{10} levels occur more frequently at Wagga Wagga than elsewhere in NSW. During 2010 at Wagga Wagga the standard was exceeded on 6 days.

Table 20: Days when PM_{10} 24-hour Ambient Air Quality NEPM standard exceeded

Date	Stations where standard exceeded	Comments(#)
12 Jan 2010	Macarthur, Albury	
21 Jan 2010	Newcastle	
28 Jan 2010	Wagga Wagga	
29 Jan 2010	Wagga Wagga	
19 Mar 2010	Wagga Wagga	
24 Mar 2010	Wagga Wagga	
26 Mar 2010	Albury	Hazard reduction burn smoke
19 May 2010	Wagga Wagga	
21 May 2010	Wagga Wagga	

(#) Events that can be clearly identified as influencing pollution levels

The Office of Environment and Heritage continues to work towards reducing emissions of anthropogenically-produced particles. The Government's key strategies in the management of particle emissions are outlined in Action for Air.

Particles as $PM_{2.5}$

Table 21: Summary for $PM_{2.5}$ – Maximum 24-hour average concentrations (2010) – continuous TEOM method

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Chullora	93.4	341	24.2	27/03/2010	20.9	27/11/2010
Earlwood	95.9	350	22.5	27/03/2010	15.4	24/03/2010
Liverpool	95.9	350	21.8	27/03/2010	16.0	28/04/2010
Richmond	97.0	354	20.8	27/03/2010	15.4	17/05/2010
Illawarra						
Wollongong	92.9	339	23.5	27/03/2010	14.8	21/03/2010
lower Hunter						
Beresfield	97.3	355	**25.9**	27/03/2010	14.2	10/01/2010
Wallsend	92.9	339	18.8	27/03/2010	10.8	24/03/2010

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

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data use USEPA factors of A=0 and B=1.00

Table 21A: Summary for $PM_{2.5}$ equivalency study – Maximum 24-hour average concentrations (2010) – FRM method

Region/ Performance monitoring Station	Data availability rates * (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Chullora	83.8	98	28.2	16/05/2010	21.7	27/11/2011

* data availability rates are based on a one day in three sampling regime.

** Please note that sampling at the Richmond site ceased at the end of 2007

*** Please note that sampling at Chullora was not conducted between the 15th - 30th Dec due to technical problems

Table 22: Days above the $PM_{2.5}$ 24-hour Ambient Air Quality NEPM advisory reporting standard

Date	Stations where advisory reporting standard exceeded	Comments(#)
27/3/2010	Beresfield	
16/5/2010	Chullora	

Liverpool recorded the highest annual 24hr $PM_{2.5}$ average of 6.3µg/m³. All regions and sites in NSW recorded concentrations below the AAQ NEPM 24-hour average advisory reporting standard for $PM_{2.5}$ except Beresfield, with the highest 24-hour average of 25.9µg/m³.

Assessment of progress towards achieving the goal

The NSW Office of Environment and Heritage (OEH) implements air quality management programs and strategies to protect ambient air quality and public health. The Ambient Air Quality NEPM goal is a driver for these strategies and a benchmark against which progress in managing air quality can be assessed.

Framework for Air Quality Management in the Sydney Greater Metropolitan Region

Action for Air, the Air Quality Management Plan for Sydney, the Lower Hunter and the Illawarra, sets out a program of measures that target the pollutants of most concern in the region – ground level ozone in summer and particles. The plan covers strategies designed to reduce emissions from industry, motor vehicles and domestic/commercial sources.

The following outlines the key mechanisms for managing ozone and particles.

Motor Vehicle and Motor Vehicle Fuels

As motor vehicles are the main source of air pollution in Sydney (producing 71% of anthropogenic NOx emissions and 38% of VOCs), the OEH has implemented a range of policies to address vehicle emissions.

NSW Cleaner Vehicles and Fuels Strategy: The Strategy sets out ten initiatives for cleaner fuels and a cleaner fleet. These include vapour recovery at service stations and the NSW diesel retrofit program (see below), as well as low volatility summertime petrol, alternative fuels, improved national standards for fuels and motor vehicles, benchmarking the fleet, a heavy vehicle rating scheme, an awareness and behaviour change component, a "FleetWise" partnership and Government leading by example.

Stage 1 vapour recovery (VR1) captures VOC emissions from underground petrol storage tanks as they are filled by road tankers. Regulatory changes made in November 2009 extended VR1 to all parts of Sydney, Illawarra, Lower Hunter and Central Coast areas. The requirements commenced in July 2010 for new and modified service stations and will apply to existing service stations from 2014.

Stage 2 vapour recovery (VR2) captures VOC emissions from vehicle petrol tanks during refuelling at petrol bowsers. VR2 commenced on a staged basis, starting in July 2010 for new and modified service stations.VR2 equipment is required to be installed at the largest service stations in Sydney, Newcastle, Wollongong and the Central Coast by 2014, and at all but the smallest service stations in Sydney by 2017.

Vapour recovery initiatives are expected to reduce VOC emissions in the Greater Metropolitan Area by 5000 tonnes per year.

The Diesel retrofit program provides for retrofitting approximately 850 existing diesel vehicles with exhaust treatment devices to reduce particle emissions. The program focuses on transport carriers and, as at December 2010, 86 fleets had taken part, reducing particle emissions from participating diesel vehicles by 50% on average.

The Clean Machine Pilot Program promotes the uptake and use of cleaner 'non-road' diesel engines, such as cranes, forklifts and dozers. The Program establishes industry partnerships to foster changed procurement practices, adopt improved worksite practices and promote the retrofit of old high use machines with diesel particulate filters. At December 2010, two organisations had formally agreed to participate in the Pilot Program and discussions were underway with ten more. The OEH is offering a diesel retrofit subsidy to assist the retrofit of up to 100 diesel plant and equipment in 2011/2012.

Commercial and domestic emissions

A number of NSW programs focus on the domestic-commercial sector as a significant contributor to air pollution in NSW.

As part of **its ongoing work to help reduce woodsmoke**, in May-July 2010 the OEH undertook audits of 223 woodheater models at 44 retailers and manufacturers to assess compliance with the *Protection of the Environment (Clean Air) Operations Regulation 2002*. The Regulation requires that

woodheaters sold in NSW comply with the relevant Australian Standard (AS/NZS4013:1999). This audit work complements the previous rebate programs and education campaigns for local council officers that have been part of OEH's Woodsmoke Reduction Program.

Working with the former Growth Centres Commission, OEH promoted measures to reduce woodsmoke impacts in new land release areas. As a result, Development Control Plans for the North West and South West Growth Centres precincts of Oran Park, Turner Road and North Kellyville prohibit open fireplaces and slow combustion stoves.

NSW is supporting development of national actions to reduce particle and ozone precursor emissions from the product and equipment sectors. NSW is working with the Commonwealth and other jurisdictions on national approaches to reduce emissions from woodheaters, small spark-ignition engines, surface coatings and non-road engines (as used for example in construction and mining). A NSW-led study of the costs and benefits of identified options for reducing emissions from the surface coatings sector was completed in June 2010.

Industry emissions

The Protection of the Environment Operations (Clean Air) Regulation 2010 provides the framework for managing air pollution from major industry.

In 2008 a program commenced that **targeted existing industry** with the greatest potential to contribute to ozone formation in the Sydney and Illawarra. The program used regulatory tools to require operational and maintenance changes in these industries to reduce VOC air emissions. These included substituting VOC containing materials or improving efficiency in handling VOC materials. The project continued in 2010, focusing on the implementation of mitigation and management measures as well as quantifying the VOC reductions achieved.

The **NSW coal mining benchmarking study** investigated international best practice measures to prevent and/or minimise emissions of particulate matter from coal mining. The study report was released on 23 December 2010 and is available at:
http://www.environment.nsw.gov.au/air/coalminingNSW.htm

To ensure the most reasonable and feasible options are implemented by each coal mine, OEH intends to require coal mines in the GMR to undertake site specific Best Management Practice reviews to reduce particulate matter emissions. This approach will mean the most up-to-date information about an individual coal mine's operations is used to determine the best approaches for improving air quality.

Coal dust emissions from Rail: In 2010 the Australian Rail Track Corporation (ARTC) completed the first stage of a pollution reduction program initiated by OEH in 2008 to help address coal dust emissions from the NSW rail network. Under the program, ARTC investigated the nature and magnitude of rail coal dust emissions in NSW and recommended possible coal dust mitigation options. The next stage of the program will require ARTC to undertake monitoring of air particles along the Hunter to Newcastle coal rail freight corridor in 2011, and undertake a best-practice review of current coal transport operations.

Regional emissions

Regional particle emissions are a significant contributor to exceedances of the Air NEPM particle goal. There are a number of potential contributors to rural air pollution in NSW including dust storms, agricultural burning, woodsmoke and bushfires. OEH and the NSW Department of Trade and Investment, Regional Infrastructure and Services are working together with local government and local communities to develop and deliver coordinated actions addressing the multiple particle sources. A community Air Quality Workshop was held in April 2010 in Wagga as part of the rural particles project. The need for more information was a key outcome of the Workshop. The OEH is therefore working with all stakeholders towards providing the community with more information about possible sources of particle pollution and how to manage the pollution impacts.

Cost curves study

A study commissioned by OEH to identify sets of actions for improving air quality in the GMR at least cost, was completed in 2010. The report is available on the OEH website at: www.environment.nsw.gov.au/air/costcurves.htm

Section D – Data analysis

The following section provides a basic statistical summary, using percentiles, for each station and for each standard. Percentiles for daily maximum values are presented. Only valid days are used in calculating these statistics.

For stations that have data sets of two years or longer, trend data, in the form of annual maximums, are provided for each standard for each pollutant. Trend data are presented if any monitoring of a particular pollutant occurred at a station in a given year and the annual data availability rate for the pollutant at that station is fifteen percent or greater.

Carbon monoxide

Statistical summary

Table 23: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Chullora	97.8	2.3	1.8	1.5	1.2	0.9	0.7	0.5	0.4
Liverpool	98.6	2.1	1.9	1.7	1.4	1.1	0.7	0.5	0.4
Macarthur	96.1	0.9	0.8	0.8	0.6	0.5	0.4	0.4	0.3
Prospect	95.8	1.9	1.7	1.4	1.2	1.0	0.7	0.5	0.4
Rozelle	93.6	1.8	1.5	1.4	1.1	0.9	0.7	0.5	0.4
Illawarra									
Wollongong	98.4	1.5	1.2	1.1	0.9	0.8	0.6	0.5	0.4
lower Hunter									
Newcastle	87.5	1.4	1.2	1.1	0.9	0.6	0.4	0.3	0.2

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Trend analysis

Table 24: Daily maximum rolling 8-hour average concentrations for CO (ppm)

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Blacktown/Prospect*	2.6	3.0	2.5	1.6			2.0*	1.5*	2.3*	1.9*
Chullora				3.4	2.8	2.3	1.8	1.6	2.6	2.3
Liverpool	3.5	3.6	5.5	3	2.8	2.1	2.1	2.4	2.2	2.1
Macarthur					1.0	1.8	1.8	0.9	0.8	0.9
Rozelle	3.2	2.8	2.2	2.2	2.1	2.0	1.8	1.5	2.3	1.8
Illawarra										
Wollongong	4.2	2.3	2.1	2.1	2.6	1.5	1.5	1.3	1.3	1.5
lower Hunter										
Newcastle	4.0	3.2	2.8	2.4	1.9	2.2	1.7	2.0	1.9	1.4

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 25: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations
Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	95.5	0	2.6	2.5	2.1	1.8	1.5	0.9	0.4	0.2
2002[(1)]	94.5	0	3.0	2.8	2.5	2.0	1.6	0.8	0.3	0.1
2003[(1)]	93.6	0	2.5	2.2	1.9	1.3	0.9	0.4	0.1	0.0
2004[(1)]	40.9	0	1.6	1.5	1.4	1.2	0.9	0.4	0.1	0.0
2005[#]										
2006[#]										
2007[(2)]	78.5	0	2.0	1.7	1.5	1.3	1.1	0.6	0.3	0.2
2008[(2)]	91.7	0	1.5	1.3	1.2	1.0	0.9	0.6	0.3	0.1
2009[(2)]	97.5	0	2.3	2.1	1.8	1.3	1.1	0.7	0.5	0.3
2010[(2)]	95.8	0	1.9	1.7	1.4	1.2	1.0	0.7	0.5	0.4

Station closed pending relocation.

Table 26: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations
Station: Chullora

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2004	84.8	0	3.4	2.2	1.9	1.7	1.3	0.8	0.5	0.3
2005	97.0	0	2.8	1.9	1.7	1.5	1.2	0.7	0.4	0.3
2006	94.7	0	2.3	1.6	1.4	1.2	1.0	0.7	0.4	0.3
2007	90.7	0	1.8	1.6	1.4	1.2	1.0	0.5	0.3	0.2
2008	92.9	0	1.6	1.3	1.2	1.0	0.8	0.5	0.3	0.2
2009	96.1	0	2.6	2.2	1.6	1.3	1.0	0.7	0.4	0.3
2010	97.8	0	2.3	1.8	1.5	1.2	0.9	0.7	0.5	0.4

Table 27: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations
Station: Liverpool

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	98.1	0	3.5	3.1	2.9	2.6	2.0	1.2	0.8	0.5
2002	85.6	0	3.6	3.2	3.0	2.5	2.0	1.2	0.7	0.5
2003	93.4	0	5.5	3.3	3.0	2.3	1.7	1.0	0.6	0.4
2004	88.9	0	3.0	2.9	2.6	2.1	1.7	0.9	0.6	0.4
2005	91.9	0	2.8	2.4	2.3	1.9	1.6	0.9	0.5	0.3
2006	96.4	0	2.1	1.8	1.7	1.5	1.3	0.9	0.5	0.3
2007	94.7	0	2.1	1.9	1.7	1.3	1.1	0.7	0.4	0.2
2008	88.0	0	2.4	2.1	1.8	1.6	1.3	0.7	0.4	0.2
2009	92.4	0	2.2	1.9	1.7	1.5	1.2	0.8	0.5	0.3
2010	98.6	0	2.1	1.9	1.7	1.4	1.1	0.7	0.5	0.4

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 28: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations
Station: Macarthur

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	55.2	0	1.0	0.9	0.8	0.7	0.5	0.4	0.3	0.2
2006	98.2	0	1.8	1.6	1.5	0.6	0.4	0.3	0.2	0.2
2007	94.0	0	1.8	1.7	1.1	0.6	0.5	0.4	0.3	0.2
2008	97.5	0	0.9	0.6	0.6	0.5	0.4	0.3	0.2	0.1
2009	95.1	0	0.8	0.8	0.7	0.6	0.6	0.4	0.4	0.2
2010	96.1	0	0.9	0.8	0.8	0.6	0.5	0.4	0.4	0.3

Table 29: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations
Station: Rozelle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	95.0	0	3.2	2.7	2.5	2.0	1.5	0.8	0.5	0.3
2002	87.5	0	2.8	2.0	1.7	1.5	1.2	0.8	0.5	0.3
2003	93.1	0	2.2	1.8	1.5	1.3	1.0	0.7	0.4	0.3
2004	94.0	0	2.2	1.9	1.7	1.4	1.1	0.7	0.4	0.3
2005	97.3	0	2.1	1.8	1.6	1.3	1.0	0.6	0.4	0.2
2006	96.6	0	2.0	1.6	1.4	1.2	0.9	0.6	0.4	0.3
2007	96.1	0	1.8	1.7	1.3	0.9	0.8	0.5	0.3	0.2
2008	94.4	0	1.5	1.3	1.2	1.1	0.9	0.5	0.3	0.2
2009	95.6	0	2.3	1.5	1.4	1.2	1.0	0.7	0.5	0.4
2010	93.6	0	1.8	1.5	1.4	1.1	0.9	0.7	0.5	0.4

Table 30: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations
Station: Wollongong

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	97.6	0	4.2	1.8	1.6	1.2	1.0	0.7	0.5	0.3
2002	91.2	0	2.3	2.1	1.8	1.5	1.2	0.9	0.5	0.3
2003	96.4	0	2.1	1.9	1.5	1.3	1.0	0.7	0.5	0.3
2004	97.3	0	2.1	1.6	1.5	1.2	1.0	0.7	0.5	0.3
2005	96.8	0	2.6	1.8	1.5	1.2	1.1	0.7	0.5	0.3
2006	98.6	0	1.5	1.3	1.2	1.0	0.9	0.6	0.4	0.3
2007	90.7	0	1.5	1.3	1.1	1.0	0.8	0.6	0.4	0.2
2008	94.0	0	1.3	0.9	0.9	0.8	0.7	0.5	0.3	0.2
2009	82.1	0	1.3	1.1	1.1	1.0	0.8	0.5	0.4	0.2
2010	98.4	0	1.5	1.2	1.1	0.9	0.8	0.6	0.5	0.4

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 31: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations
Station: Newcastle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	96.7	0	4.0	2.9	2.6	2.1	1.4	0.7	0.4	0.3
2002	94.6	0	3.2	2.8	2.0	1.4	1.1	0.6	0.4	0.3
2003	93.0	0	2.8	2.5	2.0	1.6	1.1	0.6	0.3	0.2
2004	97.0	0	2.4	2.0	1.7	1.3	1.1	0.6	0.4	0.2
2005	95.8	0	1.9	1.7	1.6	1.3	0.9	0.4	0.3	0.2
2006	94.7	0	2.2	1.6	1.5	1.0	0.8	0.4	0.3	0.2
2007	43.4	0	1.7	1.6	1.5	1.1	0.8	0.5	0.2	0.1
2008	96.1	0	2.0	1.5	1.4	1.2	1.0	0.6	0.4	0.3
2009	84.3	0	1.9	1.6	1.4	1.1	0.9	0.6	0.4	0.3
2010	87.5	0	1.4	1.2	1.1	0.9	0.6	0.4	0.3	0.2

AAQ NEPM Standard - 9.0 ppm (rolling 8-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Nitrogen dioxide

Statistical summary

Table 32: Statistical summary for NO_2 - Daily maximum 1-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	87.3	0.037	0.029	0.027	0.022	0.019	0.015	0.011	0.009
Chullora	86.8	0.057	0.042	0.040	0.036	0.032	0.028	0.023	0.018
Liverpool	92.0	0.053	0.044	0.041	0.035	0.030	0.026	0.022	0.017
Macarthur	90.4	0.042	0.039	0.036	0.032	0.029	0.025	0.020	0.015
Prospect	82.0	0.043	0.039	0.038	0.033	0.031	0.027	0.023	0.017
Richmond	87.9	0.033	0.025	0.024	0.021	0.020	0.015	0.012	0.008
Rozelle	79.6	0.049	0.039	0.037	0.034	0.031	0.028	0.022	0.015
Illawarra									
Albion Park Sth	87.5	0.041	0.030	0.027	0.023	0.019	0.013	0.008	0.004
Wollongong	87.1	0.052	0.042	0.037	0.033	0.028	0.024	0.020	0.015
lower Hunter									
Newcastle	85.9	0.038	0.032	0.031	0.029	0.028	0.023	0.017	0.011
Wallsend	86.1	0.038	0.033	0.032	0.028	0.026	0.022	0.017	0.012

AAQ NEPM Standard - 0.12 ppm (1-hour average

Bold font indicates values that exceed the AAQ NEPM standard

Trend analysis

Table 33: Maximum 1-hour average concentrations for NO_2 (ppm)

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Blacktown/Prospect*	0.058	0.057	0.055	0.048			0.049*	0.048*	0.051*	0.043*
Bringelly	0.048	0.052	0.044	0.041	0.045	0.040	0.044	0.033	0.034	0.037
Lidcombe/Chullora*	0.071	0.052	0.066*	0.056*	0.064*	0.066*	0.049*	0.044*	0.052*	0.057*
Liverpool	0.067	0.068	0.064	0.060	0.063	0.053	0.053	0.046	0.053	0.053
Macarthur				0.052	0.081	0.066	0.047	0.044	0.048	0.042
Richmond	0.038	0.048	0.036	0.037	0.036	0.044	0.029	0.027	0.030	0.033
Rozelle	0.066	0.066	0.052	0.064	0.052	0.057	0.050	0.040	0.049	0.049
Illawarra										
Albion Park/Albion Park Sth*	0.051	0.048	0.048	0.044	0.035	0.051*	0.045*	0.029*	0.052*	0.041*
Wollongong	0.056	0.056	0.049	0.044	0.058	0.050	0.043	0.046	0.048	0.052
lower Hunter										
Newcastle	0.040	0.047	0.039	0.044	0.041	0.042	0.032	0.033	0.043	0.038
Wallsend	0.044	0.043	0.050	0.041	0.038	0.037	0.035	0.031	0.040	0.038

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 34: Annual average concentrations for NO_2 (ppm)

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Blacktown/Prospect*	0.013	0.014	0.013	0.013			0.012*	0.010*	0.011*	0.012*
Bringelly	0.006	0.009	0.007	0.006	0.006	0.006	0.006	0.005	0.004	0.005
Lidcombe/Chullora*	0.016	0.013	0.016*	0.016*	0.014*	0.014*	0.013*	0.013*	0.013*	0.013*
Liverpool	0.014	0.015	0.013	0.013	0.013	0.013	0.012	0.011	0.010	0.011
Macarthur				0.009	0.012	0.011	0.011	0.010	0.009	0.009
Richmond	0.007	0.007	0.007	0.007	0.006	0.006	0.006	0.005	0.005	0.005
Rozelle	0.014	0.015	0.014	0.014	0.013	0.013	0.012	0.011	0.011	0.011
Illawarra										
Albion Park/Albion Park Sth*	0.004	0.004	0.005	0.004	0.004	0.005*	0.004*	0.004*	0.003*	0.003*
Wollongong	0.010	0.011	0.010	0.009	0.009	0.009	0.009	0.009	0.010	0.009
lower Hunter										
Newcastle	0.009	0.009	0.008	0.009	0.009	0.008	0.007	0.007	0.008	0.008
Wallsend	0.009	0.009	0.008	0.008	0.008	0.009	0.008	0.007	0.008	0.009

AAQ NEPM Standard - 0.03 ppm (Annual average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 35: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	93.3	0	0.058	0.047	0.046	0.037	0.034	0.030	0.025	0.020
2002[(1)]	92.4	0	0.057	0.051	0.047	0.043	0.037	0.032	0.025	0.020
2003[(1)]	89.8	0	0.055	0.049	0.047	0.038	0.035	0.030	0.025	0.020
2004[(1)]	39.3	0	0.048	0.045	0.043	0.038	0.035	0.030	0.024	0.019
2005[#]										
2006[#]										
2007[(2)]	64.7	0	0.049	0.044	0.042	0.037	0.034	0.029	0.025	0.020
2008[(2)]	59.5	0	0.048	0.037	0.036	0.034	0.031	0.026	0.019	0.015
2009[(2)]	84.6	0	0.051	0.040	0.039	0.035	0.032	0.027	0.022	0.017
2010[(2)]	82.0	0	0.043	0.039	0.038	0.033	0.031	0.027	0.023	0.017

Station closed pending relocation.

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 36: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Bringelly

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.4	0	0.048	0.036	0.032	0.026	0.023	0.019	0.015	0.011
2002	93.1	0	0.052	0.041	0.038	0.034	0.029	0.022	0.017	0.012
2003	87.1	0	0.044	0.032	0.029	0.022	0.020	0.017	0.013	0.010
2004	90.8	0	0.041	0.033	0.029	0.025	0.022	0.017	0.013	0.010
2005	91.5	0	0.045	0.033	0.030	0.026	0.022	0.018	0.013	0.009
2006	92.0	0	0.040	0.036	0.032	0.026	0.022	0.018	0.014	0.010
2007	92.2	0	0.044	0.033	0.029	0.024	0.022	0.016	0.012	0.009
2008	86.3	0	0.033	0.027	0.024	0.020	0.018	0.014	0.011	0.007
2009	77.9	0	0.034	0.027	0.025	0.022	0.018	0.013	0.010	0.006
2010	87.3	0	0.037	0.029	0.027	0.022	0.019	0.015	0.011	0.009

Table 37: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Lidcombe(1) / Chullora(2)

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001(1)	93.8	0	0.071	0.056	0.051	0.043	0.038	0.033	0.028	0.022
2002(1)	30.8	0	0.052	0.049	0.042	0.036	0.03	0.027	0.022	0.017
2003(2)	76.0	0	0.066	0.055	0.050	0.043	0.038	0.033	0.027	0.022
2004(2)	84.3	0	0.056	0.052	0.051	0.044	0.041	0.034	0.028	0.023
2005(2)	92.5	0	0.064	0.048	0.044	0.040	0.037	0.030	0.026	0.020
2006(2)	91.7	0	0.066	0.052	0.046	0.041	0.037	0.031	0.025	0.019
2007(2)	90.3	0	0.049	0.047	0.045	0.038	0.035	0.029	0.024	0.017
2008(2)	88.9	0	0.044	0.041	0.040	0.037	0.034	0.029	0.024	0.018
2009(2)	90.5	0	0.052	0.044	0.041	0.036	0.033	0.028	0.023	0.018
2010(2)	86.8	0	0.057	0.042	0.040	0.036	0.032	0.028	0.023	0.018

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 38: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Liverpool

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.3	0	0.067	0.053	0.047	0.043	0.037	0.031	0.027	0.021
2002	93.0	0	0.068	0.053	0.048	0.045	0.040	0.033	0.027	0.022
2003	89.2	0	0.064	0.048	0.044	0.039	0.034	0.028	0.024	0.020
2004	93.2	0	0.060	0.050	0.049	0.042	0.036	0.030	0.025	0.020
2005	92.0	0	0.063	0.051	0.045	0.039	0.034	0.029	0.024	0.020
2006	92.7	0	0.053	0.049	0.047	0.041	0.035	0.029	0.024	0.018
2007	90.5	0	0.053	0.046	0.039	0.035	0.032	0.028	0.023	0.017
2008	84.7	0	0.046	0.040	0.037	0.033	0.030	0.027	0.021	0.016
2009	85.3	0	0.053	0.044	0.042	0.034	0.030	0.025	0.020	0.015
2010	92.0	0	0.053	0.044	0.041	0.035	0.030	0.026	0.022	0.017

Table 39: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Macarthur

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2004	16.2	0	0.052	0.052	0.051	0.039	0.032	0.024	0.020	0.016
2005	91.9	0	0.081	0.053	0.048	0.042	0.035	0.030	0.024	0.019
2006	93.9	0	0.066	0.049	0.048	0.043	0.036	0.030	0.024	0.018
2007	90.2	0	0.047	0.043	0.041	0.037	0.033	0.028	0.023	0.018
2008	89.0	0	0.044	0.041	0.039	0.035	0.032	0.026	0.021	0.016
2009	91.0	0	0.048	0.044	0.040	0.035	0.031	0.025	0.020	0.016
2010	90.4	0	0.042	0.039	0.036	0.032	0.029	0.025	0.020	0.015

Table 40: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Richmond

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	92.3	0	0.038	0.031	0.030	0.027	0.025	0.020	0.016	0.011
2002	92.9	0	0.048	0.037	0.033	0.029	0.027	0.022	0.017	0.012
2003	93.0	0	0.036	0.032	0.029	0.026	0.024	0.020	0.016	0.012
2004	88.4	0	0.037	0.035	0.033	0.030	0.026	0.021	0.015	0.011
2005	90.1	0	0.036	0.032	0.030	0.027	0.025	0.020	0.014	0.010
2006	91.4	0	0.044	0.036	0.033	0.027	0.024	0.020	0.015	0.011
2007	89.1	0	0.029	0.028	0.026	0.023	0.021	0.017	0.012	0.009
2008	86.9	0	0.027	0.024	0.023	0.021	0.019	0.015	0.011	0.008
2009	91.4	0	0.030	0.027	0.026	0.023	0.020	0.016	0.012	0.009
2010	87.9	0	0.033	0.025	0.024	0.021	0.020	0.015	0.012	0.008

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 41: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Rozelle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	93.2	0	0.066	0.051	0.049	0.040	0.037	0.032	0.026	0.019
2002	87.0	0	0.066	0.058	0.052	0.045	0.041	0.034	0.027	0.019
2003	88.6	0	0.052	0.047	0.047	0.042	0.038	0.032	0.026	0.019
2004	89.2	0	0.064	0.054	0.047	0.043	0.037	0.031	0.025	0.019
2005	91.2	0	0.052	0.047	0.044	0.040	0.035	0.031	0.023	0.017
2006	92.9	0	0.057	0.050	0.044	0.038	0.035	0.030	0.025	0.017
2007	89.2	0	0.050	0.043	0.040	0.038	0.033	0.028	0.023	0.015
2008	79.1	0	0.040	0.037	0.036	0.033	0.031	0.027	0.022	0.015
2009	86.1	0	0.049	0.039	0.036	0.033	0.031	0.026	0.021	0.015
2010	79.6	0	0.049	0.039	0.037	0.034	0.031	0.028	0.022	0.015

Table 42: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Albion Park(1)/Albion Park Sth(2)

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001(1)	93.0	0	0.051	0.042	0.035	0.029	0.024	0.017	0.010	0.004
2002(1)	57.5	0	0.048	0.039	0.034	0.030	0.024	0.015	0.008	0.005
2003(1)	90.0	0	0.048	0.040	0.036	0.030	0.023	0.017	0.011	0.006
2004(1)	91.4	0	0.044	0.036	0.035	0.027	0.021	0.016	0.010	0.006
2005(1)	4.8	0	0.035	0.035	0.035	0.034	0.031	0.011	0.005	0.004
2006(2)	78.9	0	0.051	0.042	0.034	0.027	0.022	0.016	0.011	0.007
2007(2)	93.0	0	0.045	0.034	0.031	0.027	0.021	0.015	0.010	0.006
2008(2)	55.9	0	0.029	0.026	0.025	0.021	0.018	0.014	0.009	0.004
2009(2)	91.3	0	0.052	0.038	0.033	0.024	0.022	0.014	0.009	0.004
2010(2)	87.5	0	0.041	0.030	0.027	0.023	0.019	0.013	0.008	0.004

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 43: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Wollongong

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	93.6	0	0.056	0.044	0.040	0.037	0.031	0.027	0.022	0.016
2002	94.2	0	0.056	0.051	0.046	0.039	0.035	0.029	0.023	0.016
2003	93.3	0	0.049	0.041	0.037	0.035	0.032	0.027	0.022	0.017
2004	92.2	0	0.044	0.041	0.038	0.034	0.030	0.026	0.020	0.015
2005	88.6	0	0.058	0.043	0.039	0.032	0.029	0.025	0.019	0.014
2006	87.8	0	0.050	0.045	0.041	0.035	0.031	0.025	0.020	0.015
2007	89.6	0	0.043	0.038	0.037	0.032	0.029	0.025	0.020	0.014
2008	83.1	0	0.046	0.037	0.036	0.033	0.030	0.026	0.020	0.014
2009	70.1	0	0.048	0.044	0.037	0.034	0.030	0.025	0.019	0.013
2010	87.1	0	0.052	0.042	0.037	0.033	0.028	0.024	0.020	0.015

Table 44: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Newcastle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	91.5	0	0.040	0.034	0.032	0.030	0.029	0.026	0.020	0.012
2002	85.9	0	0.047	0.040	0.038	0.034	0.031	0.025	0.019	0.011
2003	95.0	0	0.039	0.035	0.034	0.032	0.029	0.025	0.019	0.011
2004	91.0	0	0.044	0.038	0.035	0.032	0.029	0.025	0.020	0.012
2005	89.7	0	0.041	0.035	0.033	0.031	0.029	0.025	0.018	0.011
2006	89.2	0	0.042	0.035	0.033	0.031	0.028	0.024	0.018	0.010
2007	40.6	0	0.032	0.031	0.029	0.026	0.025	0.021	0.015	0.009
2008	82.8	0	0.033	0.030	0.029	0.027	0.026	0.021	0.016	0.010
2009	89.5	0	0.043	0.037	0.032	0.029	0.027	0.022	0.016	0.010
2010	85.9	0	0.038	0.032	0.031	0.029	0.028	0.023	0.017	0.011

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 45: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations
Station: Wallsend

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	87.5	0	0.044	0.039	0.036	0.032	0.030	0.024	0.017	0.013
2002	63.2	0	0.043	0.039	0.034	0.029	0.028	0.024	0.018	0.014
2003	85.9	0	0.050	0.037	0.035	0.029	0.027	0.021	0.016	0.012
2004	92.2	0	0.041	0.035	0.033	0.029	0.027	0.023	0.017	0.012
2005	93.4	0	0.038	0.033	0.032	0.029	0.028	0.023	0.018	0.012
2006	92.1	0	0.037	0.035	0.034	0.030	0.027	0.023	0.018	0.013
2007	93.9	0	0.035	0.032	0.031	0.029	0.026	0.022	0.016	0.011
2008	87.1	0	0.031	0.029	0.028	0.026	0.023	0.020	0.015	0.010
2009	83.8	0	0.040	0.033	0.031	0.027	0.025	0.021	0.016	0.011
2010	86.1	0	0.038	0.033	0.032	0.028	0.026	0.022	0.017	0.012

AAQ NEPM Standard - 0.12 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Ozone

Statistical summary

Table 46: Statistical summary for O_3 - Daily maximum 1-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	89.2	**0.104**	0.081	0.075	0.061	0.052	0.040	0.031	0.026
Chullora	93.0	0.083	0.067	0.062	0.050	0.043	0.031	0.026	0.022
Liverpool	94.2	0.091	0.078	0.069	0.057	0.047	0.035	0.028	0.023
Macarthur	93.9	**0.119**	0.090	0.083	0.065	0.054	0.040	0.032	0.028
Oakdale	94.2	0.099	0.090	0.080	0.066	0.055	0.039	0.033	0.029
Prospect	88.7	**0.104**	0.082	0.072	0.062	0.050	0.038	0.030	0.023
Richmond	93.2	0.089	0.078	0.071	0.060	0.052	0.040	0.032	0.028
Rozelle	89.1	0.073	0.057	0.055	0.047	0.040	0.033	0.029	0.025
St Marys	93.5	0.095	0.083	0.073	0.064	0.053	0.040	0.032	0.027
Illawarra									
Albion Park Sth	90.3	0.093	0.061	0.059	0.049	0.041	0.031	0.028	0.026
Kembla Grange	89.7	0.081	0.061	0.056	0.049	0.043	0.033	0.029	0.025
Wollongong	91.8	0.082	0.067	0.062	0.052	0.043	0.034	0.029	0.025
lower Hunter									
Newcastle	89.1	0.086	0.069	0.060	0.049	0.041	0.036	0.031	0.027
Wallsend	88.3	0.067	0.065	0.056	0.047	0.040	0.034	0.029	0.024

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 47: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	85.2	**0.089**	0.072	0.066	0.055	0.047	0.037	0.030	0.025
Chullora	96.2	0.072	0.062	0.058	0.045	0.039	0.029	0.024	0.021
Liverpool	98.3	**0.081**	0.069	0.061	0.052	0.042	0.033	0.026	0.021
Macarthur	98.0	**0.103**	0.075	0.073	0.057	0.049	0.038	0.031	0.027
Oakdale	98.4	**0.088**	0.075	0.070	0.058	0.049	0.038	0.032	0.028
Prospect	85.9	**0.097**	0.072	0.068	0.056	0.046	0.035	0.028	0.022
Richmond	97.3	**0.082**	0.067	0.061	0.054	0.047	0.037	0.031	0.026
Rozelle	86.8	0.067	0.056	0.051	0.043	0.036	0.031	0.027	0.023
St Marys	97.8	**0.083**	0.072	0.066	0.057	0.049	0.038	0.031	0.026
Illawarra									
Albion Park Sth	86.2	0.073	0.056	0.048	0.044	0.037	0.029	0.027	0.024
Kembla Grange	86.7	0.078	0.055	0.052	0.044	0.038	0.031	0.028	0.024
Wollongong	94.9	0.073	0.061	0.055	0.046	0.039	0.032	0.027	0.024
lower Hunter									
Newcastle	85.1	0.076	0.062	0.054	0.045	0.040	0.034	0.029	0.025
Wallsend	88.2	0.063	0.056	0.052	0.042	0.037	0.032	0.027	0.023

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 48: Maximum 1-hour average concentrations for O_3 (ppm)

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Blacktown/ Prospect*	**0.153**	**0.130**	**0.181**	**0.123**			0.089	**0.107**	**0.126**	**0.104**
Bringelly	**0.175**	**0.118**	**0.155**	**0.122**	**0.112**	**0.119**	**0.111**	0.093	**0.120**	**0.104**
Lidcombe/ Chullora*	**0.156**	0.100	0.084	**0.105**	**0.086**	**0.117**	0.088	0.080	**0.154**	0.083
Liverpool	**0.141**	0.100	**0.151**	**0.113**	**0.149**	**0.128**	**0.116**	0.098	**0.151**	0.091
Macarthur				0.099	**0.142**	**0.128**	**0.121**	0.085	**0.116**	**0.119**
Oakdale	**0.135**	0.094	**0.102**	**0.124**	**0.130**	**0.109**	**0.142**	0.093	**0.128**	0.099
Richmond	**0.117**	**0.125**	**0.148**	0.096	**0.125**	**0.108**	**0.134**	0.078	**0.102**	0.089
Rozelle	**0.115**	0.100	0.083	0.094	0.081	0.093	0.088	0.056	0.083	0.073
St Marys	**0.146**	**0.119**	0.093	**0.142**	**0.113**	**0.124**	**0.123**	0.096	**0.132**	0.095
Illawarra										
Albion Park/ Albion Park Sth*	0.088	0.094	**0.130**	**0.112**	0.067	0.096*	0.092*	0.062*	**0.102***	0.093*
Kembla Grange	**0.119**	0.099	**0.113**	**0.120**	0.091	0.093	0.093	0.072	**0.103**	0.081
Wollongong	**0.116**	**0.121**	0.097	**0.103**	**0.102**	0.096	0.077	0.067	0.083	0.082
lower Hunter										
Newcastle	0.072	0.083	0.079	**0.112**	0.078	0.068	0.053	0.064	0.073	0.086
Wallsend	0.078	0.081	0.077	**0.103**	0.094	0.086	0.070	0.057	0.086	0.067
Regional										
Bathurst	0.063	0.064	0.056	0.092	0.056	0.075	0.068			

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 49: Maximum rolling 4-hour average concentrations for O_3 (ppm)

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Blacktown/ Prospect*	**0.120**	**0.107**	**0.157**	**0.107**			**0.085**	**0.096**	**0.100**	**0.097**
Bringelly	**0.128**	**0.099**	**0.133**	**0.110**	**0.102**	**0.110**	**0.095**	0.078	**0.108**	**0.089**
Lidcombe/ Chullora*	**0.137**	**0.084**	0.077	**0.086**	0.080	**0.104**	0.074	0.074	**0.112**	0.072
Liverpool	**0.120**	**0.089**	**0.132**	**0.092**	**0.121**	**0.124**	**0.094**	**0.089**	**0.103**	**0.081**
Macarthur				**0.084**	**0.126**	**0.117**	**0.101**	0.070	**0.097**	**0.103**
Oakdale	**0.105**	0.080	**0.089**	**0.099**	**0.106**	**0.085**	**0.116**	0.075	**0.108**	**0.088**
Richmond	**0.111**	**0.112**	**0.138**	**0.088**	**0.100**	**0.095**	**0.121**	0.067	**0.090**	**0.082**
Rozelle	**0.083**	**0.087**	0.070	**0.087**	0.065	**0.082**	0.075	0.048	0.073	0.067
St Marys	**0.125**	**0.093**	**0.091**	**0.128**	**0.091**	**0.109**	**0.105**	**0.082**	**0.106**	**0.083**
Illawarra										
Albion Park/ Albion Park Sth*	**0.082**	**0.083**	**0.111**	**0.092**	0.063	0.077*	0.080*	0.055*	**0.083***	0.073*
Kembla Grange	**0.092**	**0.083**	**0.107**	**0.100**	**0.084**	**0.081**	**0.082**	0.066	**0.090**	0.078
Wollongong	**0.091**	**0.099**	0.080	**0.090**	**0.099**	**0.086**	0.073	0.063	0.074	0.073
lower Hunter										
Newcastle	0.069	0.077	0.061	0.073	0.070	0.064	0.047	0.058	0.067	0.076
Wallsend	0.073	0.074	0.059	0.078	0.074	0.066	0.068	0.054	0.076	0.063
Regional										
Bathurst	0.060	0.062	0.053	0.067	0.054	0.071	0.066			

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 50: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	93.6	**5**	**0.153**	**0.110**	0.089	0.075	0.054	0.040	0.030	0.024
2002[(1)]	91.7	**2**	**0.130**	0.097	0.085	0.068	0.059	0.043	0.033	0.026
2003[(1)]	90.3	**3**	**0.181**	0.089	0.080	0.061	0.051	0.037	0.029	0.024
2004[(1)]	39.5	**2**	**0.123**	**0.103**	0.091	0.084	0.068	0.050	0.036	0.028
2005[#]										
2006[#]										
2007[(2)]	73.3	0	0.089	0.069	0.066	0.061	0.052	0.039	0.030	0.024
2008[(2)]	89.5	**1**	**0.107**	0.084	0.063	0.052	0.045	0.035	0.027	0.023
2009[(2)]	93.3	**3**	**0.126**	0.099	0.086	0.070	0.061	0.041	0.032	0.026
2010[(2)]	88.7	**2**	**0.104**	0.082	0.072	0.062	0.050	0.038	0.030	0.023

Station closed pending relocation.

Table 51: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Bringelly

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	91.5	**9**	**0.175**	**0.126**	**0.104**	0.080	0.060	0.043	0.033	0.027
2002	93.0	**2**	**0.118**	0.098	0.091	0.074	0.064	0.045	0.034	0.028
2003	91.3	**3**	**0.155**	0.099	0.078	0.066	0.056	0.041	0.032	0.028
2004	91.1	**6**	**0.122**	**0.105**	0.095	0.074	0.060	0.044	0.033	0.029
2005	88.4	**3**	**0.112**	0.091	0.081	0.066	0.057	0.043	0.034	0.029
2006	92.1	**6**	**0.119**	**0.107**	0.095	0.071	0.057	0.044	0.033	0.027
2007	92.1	**4**	**0.111**	**0.103**	0.079	0.069	0.058	0.044	0.033	0.028
2008	89.8	0	0.093	0.083	0.071	0.055	0.051	0.039	0.030	0.026
2009	90.8	**4**	**0.120**	**0.102**	0.089	0.072	0.062	0.041	0.030	0.026
2010	89.2	**2**	**0.104**	0.081	0.075	0.061	0.052	0.040	0.031	0.026

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 52: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Lidcombe[(1)] / Chullora[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	94.5	**4**	**0.156**	**0.101**	0.087	0.066	0.050	0.035	0.025	0.020
2002[(1)]	31.0	0	0.100	0.088	0.077	0.063	0.050	0.038	0.029	0.021
2003[(2)]	80.6	0	0.084	0.067	0.064	0.046	0.040	0.034	0.028	0.023
2004[(2)]	87.2	**1**	**0.105**	0.091	0.075	0.063	0.051	0.038	0.030	0.026
2005[(2)]	92.0	0	0.086	0.078	0.067	0.058	0.048	0.037	0.030	0.025
2006[(2)]	94.3	**1**	**0.117**	0.078	0.073	0.058	0.049	0.037	0.030	0.024
2007[(2)]	93.0	0	0.088	0.069	0.064	0.054	0.044	0.036	0.029	0.024
2008[(2)]	93.9	0	0.080	0.064	0.057	0.049	0.042	0.032	0.027	0.022
2009[(2)]	92.7	**2**	**0.154**	0.089	0.077	0.061	0.050	0.035	0.027	0.023
2010[(2)]	93.0	0	0.083	0.067	0.062	0.050	0.043	0.031	0.026	0.022

Table 53: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Liverpool

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.7	**5**	**0.141**	**0.122**	0.090	0.072	0.053	0.039	0.031	0.025
2002	93.6	0	0.100	0.091	0.085	0.066	0.054	0.040	0.030	0.024
2003	93.3	**4**	**0.151**	**0.105**	0.074	0.055	0.047	0.035	0.029	0.024
2004	84.0	**3**	**0.113**	0.100	0.086	0.069	0.054	0.040	0.030	0.025
2005	88.0	**1**	**0.149**	0.085	0.077	0.059	0.052	0.040	0.032	0.026
2006	91.4	**4**	**0.128**	**0.105**	0.090	0.069	0.054	0.040	0.030	0.025
2007	90.3	**2**	**0.116**	0.086	0.078	0.062	0.052	0.039	0.029	0.024
2008	87.1	0	0.098	0.074	0.065	0.057	0.046	0.035	0.028	0.023
2009	88.9	**2**	**0.151**	0.092	0.088	0.068	0.052	0.038	0.029	0.024
2010	94.2	0	0.091	0.078	0.069	0.057	0.047	0.035	0.028	0.023

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 54: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Macarthur

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2004	16.2	0	0.099	0.099	0.091	0.076	0.062	0.055	0.039	0.028
2005	94.7	**6**	**0.142**	**0.106**	0.091	0.073	0.061	0.044	0.033	0.029
2006	94.3	**8**	**0.128**	**0.116**	**0.103**	0.074	0.059	0.044	0.032	0.027
2007	90.6	**3**	**0.121**	0.098	0.089	0.071	0.059	0.042	0.032	0.027
2008	93.6	0	0.085	0.081	0.072	0.059	0.052	0.037	0.031	0.027
2009	92.3	**7**	**0.116**	**0.108**	**0.102**	0.078	0.062	0.043	0.032	0.028
2010	93.9	**1**	**0.119**	0.090	0.083	0.065	0.054	0.040	0.032	0.028

Table 55: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Oakdale

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	34.7	**7**	**0.135**	**0.125**	**0.118**	**0.101**	0.078	0.045	0.031	0.025
2002	18.6	0	0.094	0.094	0.089	0.083	0.077	0.062	0.047	0.037
2003	91.1	**1**	**0.102**	0.083	0.075	0.066	0.055	0.042	0.033	0.029
2004	77.3	**7**	**0.124**	**0.106**	**0.103**	0.074	0.065	0.047	0.035	0.030
2005	91.9	**4**	**0.130**	**0.105**	0.085	0.071	0.058	0.043	0.034	0.030
2006	87.9	**1**	**0.109**	0.089	0.083	0.070	0.060	0.048	0.035	0.030
2007	87.6	**4**	**0.142**	**0.104**	0.092	0.071	0.060	0.044	0.034	0.030
2008	92.5	0	0.093	0.070	0.065	0.058	0.050	0.039	0.032	0.027
2009	85.9	**6**	**0.128**	**0.106**	0.093	0.078	0.058	0.042	0.032	0.029
2010	94.2	0	0.099	0.090	0.080	0.066	0.055	0.039	0.033	0.029

Table 56: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Richmond

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	90.8	**5**	**0.117**	**0.112**	0.097	0.074	0.056	0.042	0.033	0.027
2002	92.5	**2**	**0.125**	0.097	0.085	0.071	0.063	0.044	0.034	0.029
2003	86.1	**2**	**0.148**	0.086	0.078	0.061	0.053	0.039	0.030	0.026
2004	89.5	0	0.096	0.080	0.076	0.065	0.058	0.045	0.034	0.029
2005	91.8	**2**	**0.125**	0.091	0.083	0.065	0.058	0.045	0.035	0.029
2006	92.8	**2**	**0.108**	0.088	0.077	0.069	0.058	0.046	0.035	0.029
2007	91.1	**1**	**0.134**	0.086	0.075	0.068	0.058	0.045	0.034	0.029
2008	90.6	0	0.078	0.066	0.061	0.053	0.045	0.036	0.030	0.026
2009	90.1	**1**	**0.102**	0.086	0.078	0.066	0.058	0.043	0.034	0.029
2010	93.2	0	0.089	0.078	0.071	0.060	0.052	0.040	0.032	0.028

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 57: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Rozelle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	93.4	**1**	**0.115**	0.069	0.058	0.048	0.040	0.032	0.026	0.021
2002	88.1	0	0.100	0.076	0.066	0.055	0.044	0.035	0.028	0.023
2003	91.2	0	0.083	0.069	0.059	0.045	0.037	0.031	0.027	0.023
2004	88.9	0	0.094	0.080	0.074	0.056	0.045	0.034	0.027	0.024
2005	88.9	0	0.081	0.069	0.060	0.051	0.044	0.034	0.029	0.024
2006	92.2	0	0.093	0.069	0.063	0.052	0.042	0.032	0.027	0.023
2007	92.0	0	0.088	0.058	0.05	0.046	0.041	0.033	0.027	0.023
2008	92.8	0	0.056	0.050	0.046	0.042	0.038	0.030	0.026	0.022
2009	92.6	0	0.083	0.068	0.060	0.050	0.042	0.032	0.028	0.023
2010	89.1	0	0.073	0.057	0.055	0.047	0.040	0.033	0.029	0.025

Table 58: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: St Marys

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	90.3	**6**	**0.146**	**0.113**	0.100	0.077	0.059	0.043	0.033	0.028
2002	95.3	**1**	**0.119**	0.093	0.085	0.067	0.059	0.046	0.034	0.028
2003	92.7	0	0.093	0.077	0.068	0.059	0.052	0.037	0.030	0.026
2004	93.3	**3**	**0.142**	0.097	0.085	0.068	0.058	0.044	0.033	0.029
2005	92.1	**2**	**0.113**	0.090	0.078	0.066	0.058	0.042	0.034	0.029
2006	92.6	**3**	**0.124**	0.091	0.078	0.067	0.056	0.043	0.032	0.027
2007	92.2	**3**	**0.123**	0.093	0.077	0.065	0.057	0.044	0.033	0.028
2008	92.7	0	0.096	0.076	0.060	0.053	0.048	0.038	0.031	0.026
2009	93.0	**5**	**0.132**	**0.102**	0.082	0.073	0.062	0.041	0.032	0.028
2010	93.5	0	0.095	0.083	0.073	0.064	0.053	0.040	0.032	0.027

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 59: Statistical summary for O_3 - Annual daily maximum 1-hour average concentration
Station: Albion Park[(1)]/Albion Park Sth[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	93.6	0	0.088	0.079	0.068	0.056	0.045	0.037	0.032	0.027
2002[(1)]	57.6	0	0.094	0.084	0.072	0.050	0.044	0.033	0.027	0.024
2003[(1)]	92.8	**4**	**0.130**	**0.105**	0.067	0.044	0.040	0.034	0.030	0.027
2004[(1)]	93.5	**1**	**0.112**	0.083	0.068	0.051	0.044	0.035	0.030	0.027
2005[(1)]	4.8	0	0.067	0.067	0.067	0.066	0.060	0.038	0.030	0.023
2006[(2)]	86.2	0	0.096	0.083	0.075	0.054	0.046	0.036	0.031	0.027
2007[(2)]	91.4	0	0.092	0.071	0.060	0.051	0.042	0.035	0.031	0.028
2008[(2)]	90.5	0	0.062	0.058	0.056	0.047	0.040	0.034	0.030	0.025
2009[(2)]	93.2	**1**	**0.102**	0.075	0.070	0.053	0.044	0.037	0.034	0.030
2010[(2)]	90.3	0	0.093	0.061	0.059	0.049	0.041	0.031	0.028	0.026

Table 60: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Kembla Grange

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	82.3	**2**	**0.119**	0.087	0.079	0.056	0.046	0.036	0.030	0.025
2002	91.7	0	0.099	0.084	0.08	0.056	0.044	0.036	0.031	0.026
2003	93.3	**2**	**0.113**	0.095	0.069	0.044	0.038	0.033	0.03	0.026
2004	91.3	**3**	**0.120**	0.093	0.064	0.052	0.043	0.036	0.031	0.027
2005	92.6	0	0.091	0.074	0.066	0.054	0.044	0.036	0.032	0.027
2006	94.6	0	0.093	0.074	0.065	0.052	0.047	0.036	0.03	0.026
2007	94.1	0	0.093	0.076	0.063	0.049	0.043	0.034	0.031	0.027
2008	93.6	0	0.072	0.063	0.055	0.048	0.042	0.032	0.029	0.025
2009	87.5	**1**	**0.103**	0.083	0.07	0.052	0.044	0.035	0.031	0.027
2010	89.7	0	0.081	0.061	0.056	0.049	0.043	0.033	0.029	0.025

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 61: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Wollongong

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.0	**1**	**0.116**	0.082	0.073	0.061	0.051	0.037	0.030	0.025
2002	90.7	**2**	**0.121**	0.085	0.082	0.064	0.048	0.036	0.030	0.024
2003	92.8	0	0.097	0.086	0.072	0.046	0.040	0.033	0.029	0.025
2004	92.5	**1**	**0.103**	0.084	0.071	0.056	0.043	0.034	0.029	0.026
2005	92.4	**1**	**0.102**	0.074	0.066	0.054	0.046	0.035	0.030	0.026
2006	94.6	0	0.096	0.073	0.064	0.054	0.047	0.036	0.030	0.026
2007	90.2	0	0.077	0.068	0.062	0.051	0.042	0.035	0.029	0.025
2008	94.0	0	0.067	0.062	0.056	0.048	0.043	0.033	0.029	0.025
2009	90.7	0	0.083	0.074	0.056	0.046	0.041	0.034	0.030	0.026
2010	91.8	0	0.082	0.067	0.062	0.052	0.043	0.034	0.029	0.025

Table 62: Statistical summary for O_3 - Annual daily maximum 1-hour average concentration
Station: Newcastle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	93.3	0	0.072	0.064	0.058	0.050	0.040	0.034	0.029	0.024
2002	94.0	0	0.083	0.079	0.062	0.054	0.046	0.037	0.030	0.025
2003	92.4	0	0.079	0.065	0.055	0.045	0.039	0.035	0.030	0.025
2004	92.3	**1**	**0.112**	0.070	0.067	0.052	0.044	0.036	0.030	0.025
2005	92.4	0	0.078	0.061	0.058	0.049	0.042	0.035	0.030	0.026
2006	93.7	0	0.068	0.063	0.060	0.047	0.042	0.035	0.029	0.024
2007	43.9	0	0.053	0.052	0.051	0.047	0.040	0.033	0.027	0.022
2008	89.9	0	0.064	0.054	0.049	0.044	0.039	0.034	0.028	0.024
2009	86.3	0	0.073	0.068	0.062	0.050	0.043	0.037	0.032	0.027
2010	89.1	0	0.086	0.069	0.060	0.049	0.041	0.036	0.031	0.027

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 63: Statistical summary for O_3 - Annual daily maximum 1-hour average concentration
Station: Wallsend

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	87.9	0	0.078	0.072	0.065	0.053	0.046	0.036	0.028	0.023
2002	81.9	0	0.081	0.075	0.070	0.058	0.049	0.038	0.031	0.025
2003	91.6	0	0.077	0.065	0.061	0.050	0.042	0.034	0.029	0.025
2004	88.2	**1**	**0.103**	0.075	0.065	0.054	0.048	0.037	0.031	0.026
2005	91.3	0	0.094	0.070	0.065	0.053	0.046	0.037	0.031	0.026
2006	93.2	0	0.086	0.070	0.062	0.051	0.045	0.036	0.029	0.024
2007	92.3	0	0.070	0.063	0.055	0.049	0.045	0.036	0.029	0.025
2008	91.9	0	0.057	0.054	0.052	0.044	0.040	0.033	0.028	0.023
2009	85.7	0	0.086	0.068	0.063	0.054	0.044	0.036	0.030	0.024
2010	88.3	0	0.067	0.065	0.056	0.047	0.040	0.034	0.029	0.024

Table 64: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations
Station: Bathurst

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	50.4	0	0.063	0.054	0.051	0.048	0.045	0.036	0.032	0.027
2002	34.7	0	0.064	0.063	0.063	0.058	0.052	0.044	0.038	0.031
2003	76.4	0	0.056	0.052	0.051	0.047	0.042	0.036	0.032	0.029
2004	89.9	0	0.092	0.069	0.061	0.054	0.050	0.043	0.034	0.029
2005	90.7	0	0.056	0.054	0.052	0.048	0.044	0.038	0.033	0.030
2006	94.5	0	0.075	0.067	0.060	0.054	0.048	0.041	0.034	0.029
2007	54.3	0	0.068	0.067	0.062	0.054	0.050	0.039	0.032	0.029

AAQ NEPM Standard - 0.10 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 65: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	97.7	**8**	**0.120**	**0.092**	**0.081**	0.065	0.048	0.037	0.029	0.022
2002[(1)]	95.7	**5**	**0.107**	**0.084**	0.079	0.061	0.054	0.039	0.031	0.023
2003[(1)]	94.3	**3**	**0.157**	0.080	0.069	0.056	0.045	0.035	0.028	0.023
2004[(1)]	41.3	**4**	**0.107**	**0.089**	**0.081**	0.070	0.062	0.044	0.033	0.026
2005[#]										
2006[#]										
2007[(2)]	75.1	**1**	**0.085**	0.063	0.060	0.055	0.048	0.036	0.028	0.023
2008[(2)]	93.1	**1**	**0.096**	0.069	0.058	0.047	0.042	0.033	0.026	0.022
2009[(2)]	95.7	**6**	**0.100**	**0.087**	0.074	0.063	0.053	0.039	0.030	0.024
2010[(2)]	85.9	**2**	**0.097**	0.072	0.068	0.056	0.046	0.035	0.028	0.022

Station closed pending relocation.

Table 66: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Bringelly

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	95.4	**12**	**0.128**	**0.107**	**0.088**	0.070	0.054	0.039	0.032	0.026
2002	96.8	**7**	**0.099**	**0.089**	**0.082**	0.066	0.055	0.041	0.032	0.026
2003	95.3	**5**	**0.133**	**0.083**	0.069	0.059	0.050	0.038	0.031	0.026
2004	95.1	**6**	**0.110**	**0.088**	0.080	0.064	0.053	0.041	0.032	0.028
2005	92.4	**3**	**0.102**	0.079	0.072	0.060	0.050	0.040	0.032	0.027
2006	96.1	**5**	**0.110**	**0.084**	0.077	0.062	0.051	0.041	0.031	0.026
2007	94.8	**4**	**0.095**	**0.083**	0.071	0.058	0.052	0.040	0.031	0.027
2008	93.6	0	0.078	0.071	0.061	0.050	0.046	0.036	0.029	0.025
2009	92.5	**5**	**0.108**	**0.085**	0.078	0.063	0.054	0.039	0.029	0.025
2010	85.2	**3**	**0.089**	0.072	0.066	0.055	0.047	0.037	0.030	0.025

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 67: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Lidcombe[(1)] / Chullora[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	98.5	**4**	**0.137**	**0.082**	0.077	0.057	0.044	0.032	0.024	0.019
2002[(1)]	32.4	**1**	**0.084**	0.078	0.071	0.055	0.044	0.036	0.026	0.020
2003[(2)]	84.2	0	0.077	0.059	0.055	0.041	0.037	0.032	0.026	0.021
2004[(2)]	91.2	**4**	**0.086**	**0.081**	0.067	0.054	0.045	0.035	0.029	0.024
2005[(2)]	96.2	0	0.080	0.066	0.061	0.052	0.042	0.034	0.028	0.023
2006[(2)]	98.8	**2**	**0.104**	0.071	0.064	0.054	0.044	0.034	0.028	0.022
2007[(2)]	97.1	0	0.074	0.065	0.057	0.051	0.041	0.033	0.027	0.022
2008[(2)]	98.3	0	0.074	0.058	0.050	0.045	0.039	0.030	0.025	0.020
2009[(2)]	96.8	**2**	**0.112**	0.075	0.070	0.056	0.045	0.033	0.026	0.021
2010[(2)]	96.2	0	0.072	0.062	0.058	0.045	0.039	0.029	0.024	0.021

Table 68: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Liverpool

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	99.0	**7**	**0.120**	**0.095**	0.080	0.065	0.048	0.036	0.029	0.023
2002	97.7	**5**	**0.089**	**0.082**	0.073	0.058	0.048	0.036	0.028	0.022
2003	97.1	**3**	**0.132**	0.076	0.063	0.049	0.041	0.033	0.028	0.022
2004	87.6	**4**	**0.092**	**0.082**	0.071	0.062	0.048	0.036	0.029	0.023
2005	92.0	**2**	**0.121**	0.074	0.068	0.053	0.046	0.036	0.030	0.024
2006	95.2	**4**	**0.124**	**0.088**	0.074	0.064	0.049	0.037	0.028	0.023
2007	92.3	**2**	**0.094**	0.074	0.067	0.057	0.046	0.035	0.028	0.022
2008	90.5	**1**	**0.089**	0.064	0.057	0.050	0.042	0.032	0.026	0.021
2009	92.5	**4**	**0.103**	0.085	0.077	0.057	0.046	0.035	0.028	0.022
2010	98.3	**1**	**0.081**	0.069	0.061	0.052	0.042	0.033	0.026	0.021

Table 69: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Macarthur

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2004	16.9	**1**	**0.084**	**0.084**	0.080	0.061	0.055	0.047	0.037	0.027
2005	98.9	**7**	**0.126**	**0.096**	0.080	0.061	0.055	0.040	0.032	0.028
2006	98.5	**8**	**0.117**	**0.094**	**0.085**	0.066	0.054	0.040	0.030	0.025
2007	94.1	**7**	**0.101**	**0.084**	0.079	0.063	0.054	0.039	0.030	0.025
2008	97.9	0	0.070	0.065	0.063	0.054	0.047	0.035	0.030	0.025
2009	96.6	**9**	**0.097**	**0.090**	**0.083**	0.068	0.056	0.040	0.031	0.027
2010	98.0	**1**	**0.103**	0.075	0.073	0.057	0.049	0.038	0.031	0.027

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 70: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Oakdale

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	36.2	**8**	**0.105**	**0.100**	**0.095**	**0.087**	0.058	0.042	0.029	0.024
2002	19.4	0	0.080	0.080	0.079	0.073	0.069	0.055	0.043	0.034
2003	95.0	**3**	**0.089**	0.079	0.067	0.057	0.050	0.039	0.032	0.028
2004	80.6	**6**	**0.099**	**0.090**	**0.084**	0.066	0.057	0.043	0.033	0.030
2005	95.9	**4**	**0.106**	**0.088**	0.074	0.062	0.052	0.040	0.032	0.029
2006	91.6	**1**	**0.085**	0.078	0.072	0.061	0.053	0.043	0.033	0.029
2007	91.0	**5**	**0.116**	**0.086**	0.077	0.063	0.053	0.042	0.033	0.029
2008	96.8	0	0.075	0.061	0.056	0.052	0.045	0.037	0.031	0.026
2009	89.9	**6**	**0.108**	**0.090**	0.080	0.064	0.053	0.040	0.032	0.029
2010	98.4	**2**	**0.088**	0.075	0.070	0.058	0.049	0.038	0.032	0.028

Table 71: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Richmond

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.5	**6**	**0.111**	**0.089**	0.076	0.065	0.050	0.039	0.031	0.026
2002	96.3	**4**	**0.112**	**0.081**	0.074	0.062	0.056	0.041	0.032	0.027
2003	89.5	**3**	**0.138**	0.078	0.068	0.056	0.048	0.037	0.029	0.025
2004	93.8	**1**	**0.088**	0.074	0.068	0.057	0.052	0.042	0.032	0.028
2005	96.3	**3**	**0.100**	0.080	0.069	0.060	0.052	0.042	0.033	0.028
2006	97.3	**2**	**0.095**	0.078	0.072	0.061	0.052	0.042	0.034	0.027
2007	94.1	**3**	**0.121**	0.079	0.068	0.059	0.053	0.042	0.032	0.027
2008	94.5	0	0.067	0.060	0.055	0.048	0.041	0.034	0.029	0.024
2009	94.2	**3**	**0.090**	0.079	0.069	0.058	0.051	0.040	0.032	0.027
2010	97.3	**1**	**0.082**	0.067	0.061	0.054	0.047	0.037	0.031	0.026

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 72: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Rozelle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	97.4	**1**	**0.083**	0.057	0.051	0.041	0.036	0.030	0.024	0.019
2002	92.1	**1**	**0.087**	0.061	0.057	0.047	0.040	0.031	0.026	0.021
2003	95.3	0	0.070	0.058	0.052	0.039	0.034	0.029	0.025	0.021
2004	92.9	**1**	**0.087**	0.071	0.066	0.051	0.041	0.032	0.026	0.022
2005	92.9	0	0.065	0.060	0.055	0.045	0.039	0.032	0.027	0.022
2006	96.6	**1**	**0.082**	0.063	0.056	0.047	0.037	0.031	0.025	0.021
2007	93.7	0	0.075	0.054	0.046	0.042	0.037	0.031	0.026	0.021
2008	97.0	0	0.048	0.046	0.043	0.038	0.034	0.028	0.025	0.020
2009	94.8	0	0.073	0.059	0.054	0.044	0.037	0.031	0.026	0.022
2010	86.8	0	0.067	0.056	0.051	0.043	0.036	0.031	0.027	0.023

Table 73: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: St Marys

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.2	**10**	**0.125**	**0.102**	**0.085**	0.068	0.051	0.040	0.031	0.027
2002	99.7	**7**	**0.093**	**0.085**	0.075	0.060	0.053	0.042	0.032	0.026
2003	96.8	**2**	**0.091**	0.063	0.061	0.052	0.047	0.035	0.029	0.025
2004	97.5	**3**	**0.128**	**0.081**	0.070	0.060	0.052	0.040	0.032	0.027
2005	96.2	**3**	**0.091**	0.078	0.068	0.059	0.050	0.040	0.032	0.027
2006	96.6	**4**	**0.109**	**0.084**	0.067	0.059	0.052	0.041	0.030	0.026
2007	93.1	**4**	**0.105**	**0.088**	0.069	0.058	0.051	0.040	0.031	0.026
2008	97.0	**1**	**0.082**	0.069	0.056	0.048	0.044	0.036	0.029	0.025
2009	97.2	**5**	**0.106**	**0.087**	0.073	0.063	0.055	0.039	0.031	0.026
2010	97.8	**1**	**0.083**	0.072	0.066	0.057	0.049	0.038	0.031	0.026

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 74: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Albion Park[(1)]/Albion Park Sth[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	97.7	**1**	**0.082**	0.067	0.061	0.049	0.042	0.036	0.031	0.026
2002[(1)]	60.0	**1**	**0.083**	0.071	0.066	0.046	0.039	0.031	0.026	0.022
2003[(1)]	96.8	**4**	**0.111**	**0.085**	0.061	0.040	0.037	0.033	0.029	0.025
2004[(1)]	97.5	**1**	**0.092**	0.077	0.057	0.047	0.040	0.033	0.029	0.026
2005[(1)]	5.0	0	0.063	0.063	0.063	0.061	0.054	0.039	0.029	0.022
2006[(2)]	90.0	0	0.077	0.073	0.065	0.048	0.041	0.035	0.030	0.026
2007[(2)]	94.6	0	0.080	0.061	0.057	0.046	0.039	0.033	0.030	0.026
2008[(2)]	94.1	0	0.055	0.053	0.048	0.044	0.038	0.032	0.029	0.024
2009[(2)]	95.4	**1**	**0.083**	0.066	0.060	0.048	0.041	0.036	0.033	0.028
2010[(2)]	86.2	0	0.073	0.056	0.048	0.044	0.037	0.029	0.027	0.024

Table 75: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Kembla Grange

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	85.7	**2**	**0.092**	0.076	0.063	0.052	0.042	0.034	0.029	0.024
2002	95.8	**1**	**0.083**	0.074	0.070	0.048	0.040	0.034	0.029	0.025
2003	97.4	**3**	**0.107**	0.077	0.060	0.042	0.035	0.032	0.028	0.024
2004	95.4	**3**	**0.100**	0.078	0.055	0.047	0.040	0.034	0.029	0.025
2005	96.7	**1**	**0.084**	0.063	0.059	0.048	0.041	0.034	0.030	0.026
2006	98.9	**1**	**0.081**	0.063	0.057	0.046	0.042	0.034	0.029	0.025
2007	97.8	**1**	**0.082**	0.065	0.059	0.046	0.040	0.033	0.029	0.025
2008	97.5	0	0.066	0.054	0.050	0.043	0.039	0.031	0.028	0.023
2009	90.1	**2**	**0.090**	0.075	0.065	0.046	0.040	0.033	0.029	0.026
2010	86.7	0	0.078	0.055	0.052	0.044	0.038	0.031	0.028	0.024

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 76: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Wollongong

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	98.0	**1**	**0.091**	0.070	0.067	0.053	0.045	0.034	0.029	0.024
2002	94.6	**2**	**0.099**	0.077	0.071	0.059	0.044	0.034	0.028	0.023
2003	96.4	0	0.080	0.077	0.062	0.042	0.037	0.031	0.028	0.024
2004	96.3	**2**	**0.090**	0.068	0.061	0.050	0.040	0.032	0.028	0.024
2005	96.2	**1**	**0.099**	0.064	0.061	0.049	0.041	0.033	0.029	0.024
2006	98.6	**1**	**0.086**	0.066	0.055	0.048	0.042	0.033	0.028	0.024
2007	93.2	0	0.073	0.064	0.054	0.046	0.039	0.033	0.028	0.023
2008	97.9	0	0.063	0.056	0.051	0.043	0.040	0.031	0.027	0.023
2009	92.9	0	0.074	0.064	0.050	0.043	0.037	0.033	0.029	0.025
2010	94.9	0	0.073	0.061	0.055	0.046	0.039	0.032	0.027	0.024

Table 77: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentrations
Station: Newcastle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	97.4	0	0.069	0.057	0.052	0.043	0.037	0.032	0.027	0.023
2002	98.2	0	0.077	0.072	0.055	0.050	0.041	0.034	0.028	0.023
2003	96.3	0	0.061	0.055	0.050	0.042	0.038	0.033	0.028	0.024
2004	96.4	0	0.073	0.062	0.059	0.048	0.041	0.034	0.028	0.024
2005	96.5	0	0.070	0.055	0.050	0.044	0.039	0.033	0.028	0.024
2006	97.9	0	0.064	0.057	0.053	0.043	0.038	0.033	0.028	0.022
2007	45.6	0	0.047	0.046	0.046	0.041	0.036	0.031	0.025	0.021
2008	93.8	0	0.058	0.049	0.046	0.040	0.037	0.032	0.027	0.022
2009	88.2	0	0.067	0.062	0.056	0.047	0.042	0.035	0.031	0.025
2010	85.1	0	0.076	0.062	0.054	0.045	0.040	0.034	0.029	0.025

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 78: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Wallsend

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	91.7	0	0.073	0.065	0.056	0.048	0.041	0.033	0.027	0.021
2002	85.6	0	0.074	0.068	0.065	0.053	0.043	0.035	0.029	0.023
2003	95.7	0	0.059	0.058	0.056	0.044	0.039	0.032	0.028	0.024
2004	92.0	0	0.078	0.065	0.057	0.050	0.044	0.035	0.029	0.024
2005	95.4	0	0.074	0.063	0.058	0.048	0.041	0.034	0.029	0.024
2006	97.3	0	0.066	0.064	0.057	0.046	0.040	0.033	0.027	0.023
2007	95.1	0	0.068	0.057	0.050	0.045	0.041	0.034	0.028	0.023
2008	95.7	0	0.054	0.048	0.045	0.040	0.036	0.031	0.027	0.022
2009	89.2	0	0.076	0.063	0.058	0.046	0.040	0.034	0.028	0.023
2010	88.2	0	0.063	0.056	0.052	0.042	0.037	0.032	0.027	0.023

Table 79: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration
Station: Bathurst

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	52.3	0	0.060	0.051	0.050	0.046	0.042	0.035	0.030	0.025
2002	36.1	0	0.062	0.060	0.057	0.054	0.049	0.043	0.037	0.030
2003	79.6	0	0.053	0.050	0.049	0.045	0.040	0.035	0.031	0.028
2004	93.7	0	0.067	0.058	0.055	0.050	0.048	0.041	0.032	0.027
2005	94.5	0	0.054	0.052	0.050	0.046	0.042	0.036	0.032	0.029
2006	98.5	0	0.071	0.062	0.058	0.051	0.045	0.040	0.033	0.028
2007	56.7	0	0.066	0.062	0.059	0.050	0.048	0.037	0.031	0.028

AAQ NEPM Standard - 0.08 ppm (rolling 4-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Sulfur dioxide

Statistical summary

Table 80: Statistical summary for SO_2 - Daily maximum 1-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	79.9	0.008	0.005	0.005	0.004	0.003	0.002	0.001	0.000
Chullora	91.9	0.021	0.015	0.014	0.010	0.007	0.004	0.002	0.001
Macarthur	92.9	0.010	0.006	0.006	0.005	0.004	0.002	0.001	0.001
Prospect	88.9	0.018	0.013	0.011	0.008	0.006	0.004	0.002	0.001
Richmond	93.3	0.009	0.007	0.006	0.005	0.003	0.002	0.001	0.000
Illawarra									
Albion Park Sth	89.6	0.032	0.027	0.023	0.019	0.013	0.005	0.001	0.000
Wollongong	88.4	0.027	0.018	0.015	0.013	0.011	0.006	0.003	0.001
lower Hunter									
Newcastle	84.6	0.027	0.022	0.020	0.015	0.012	0.008	0.004	0.002
Wallsend	70.3	0.031	0.022	0.020	0.017	0.014	0.009	0.004	0.001

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Table 81: Statistical summary for SO_2 - Daily 24-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	85.8	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
Chullora	95.9	0.004	0.004	0.003	0.003	0.002	0.001	0.001	0.000
Macarthur	97.0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000
Prospect	96.4	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000
Richmond	97.5	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
Illawarra									
Albion Park Sth	97.8	0.011	0.010	0.008	0.006	0.003	0.001	0.000	0.000
Wollongong	92.9	0.008	0.005	0.004	0.002	0.002	0.001	0.000	0.000
lower Hunter									
Newcastle	91.8	0.005	0.005	0.004	0.004	0.003	0.002	0.001	0.000
Wallsend	74.2	0.007	0.005	0.004	0.003	0.003	0.002	0.001	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Trend analysis

Table 82: Maximum 1-hour average concentrations for SO_2 (ppm)

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Blacktown / Prospect*	0.020	0.021	0.016	0.016			0.022	0.014	0.017	0.018
Bringelly	0.012	0.010	0.017	0.015	0.009	0.009	0.017	0.019	0.012	0.008
Chullora					0.015	0.015	0.020	0.021	0.029	0.021
Macarthur					0.015	0.010	0.015	0.015	0.010	0.010
Richmond	0.012	0.028	0.012	0.021	0.015	0.018	0.024	0.015	0.013	0.009
Illawarra										
Albion Park / Albion Park Sth*	0.034	0.029	0.035	0.034	0.032	0.038*	0.038*	0.028*	0.031*	0.032*
Warrawong	0.162	0.046	0.063	0.088	0.070	0.022				
Wollongong	0.030	0.039	0.031	0.053	0.038	0.035	0.032	0.021	0.020	0.027
lower Hunter										
Newcastle					0.037	0.034	0.043	0.033	0.039	0.027
Wallsend	0.049	0.045	0.047	0.067	0.048	0.058	0.039	0.044	0.044	0.031

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Table 83: Maximum 24-hour average concentrations for SO_2 (ppm)

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Blacktown / Prospect*	0.005	0.004	0.004	0.004			0.005	0.004	0.003	0.004
Bringelly	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.002
Chullora					0.005	0.004	0.004	0.005	0.005	0.004
Macarthur					0.003	0.003	0.004	0.004	0.004	0.003
Richmond	0.010	0.004	0.003	0.004	0.002	0.003	0.004	0.003	0.004	0.002
Illawarra										
Albion Park / Albion Park Sth*	0.013	0.009	0.009	0.009	0.011	0.010*	0.014*	0.008*	0.012*	0.011*
Warrawong	0.013	0.009	0.011	0.012	0.009	0.007				
Wollongong	0.007	0.008	0.006	0.015	0.006	0.007	0.008	0.007	0.004	0.008
lower Hunter										
Newcastle					0.008	0.009	0.012	0.008	0.010	0.005
Wallsend	0.013	0.011	0.010	0.014	0.007	0.009	0.007	0.007	0.007	0.007

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 84: Annual average concentrations for SO_2 (ppm)

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Blacktown / Prospect*	0.001	0.001	0.001	0.001			0.001	0.000	0.000	0.001
Bringelly	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Chullora					0.001	0.001	0.001	0.001	0.001	0.001
Macarthur					0.001	0.001	0.001	0.001	0.001	0.000
Richmond	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Illawarra										
Albion Park / Albion Park Sth*	0.001	0.001	0.001	0.001	0.002	0.001*	0.001*	0.001*	0.001*	0.001*
Warrawong	0.002	0.001	0.001	0.001	0.001	0.001				
Wollongong	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001
lower Hunter										
Newcastle					0.002	0.001	0.001	0.001	0.001	0.001
Wallsend	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.002	0.001	0.001

AAQ NEPM Standard - 0.02 ppm (Annual average)

Table 85: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Blacktown(1)/Prospect(2)

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001(1)	93.9	0	0.020	0.015	0.012	0.009	0.007	0.005	0.003	0.002
2002(1)	93.2	0	0.021	0.014	0.012	0.008	0.006	0.004	0.003	0.002
2003(1)	91.3	0	0.016	0.012	0.010	0.007	0.006	0.004	0.003	0.002
2004(1)	39.1	0	0.016	0.013	0.012	0.010	0.007	0.006	0.004	0.002
2005#										
2006#										
2007(2)	67.0	0	0.022	0.016	0.013	0.007	0.006	0.003	0.002	0.001
2008(2)	85.1	0	0.014	0.011	0.010	0.008	0.005	0.003	0.002	0.001
2009(2)	91.3	0	0.017	0.010	0.010	0.008	0.006	0.004	0.002	0.001
2010(2)	88.9	0	0.018	0.013	0.011	0.008	0.006	0.004	0.002	0.001

Station closed pending relocation.

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 86: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Bringelly

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.7	0	0.012	0.010	0.008	0.005	0.005	0.003	0.002	0.001
2002	94.6	0	0.010	0.009	0.009	0.006	0.004	0.002	0.001	0.001
2003	93.0	0	0.017	0.007	0.006	0.004	0.003	0.002	0.001	0.001
2004	90.8	0	0.015	0.008	0.007	0.005	0.004	0.002	0.001	0.000
2005	91.3	0	0.009	0.008	0.006	0.004	0.004	0.002	0.001	0.000
2006	91.4	0	0.009	0.006	0.005	0.004	0.003	0.002	0.001	0.001
2007	84.2	0	0.017	0.009	0.007	0.005	0.004	0.002	0.001	0.000
2008	89.2	0	0.019	0.008	0.006	0.005	0.003	0.002	0.001	0.000
2009	84.6	0	0.012	0.008	0.005	0.004	0.003	0.001	0.000	0.000
2010	79.9	0	0.008	0.005	0.005	0.004	0.003	0.002	0.001	0.000

Table 87: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Chullora

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	68.8	0	0.015	0.013	0.011	0.009	0.007	0.004	0.002	0.001
2006	93.9	0	0.015	0.013	0.011	0.009	0.007	0.004	0.003	0.002
2007	86.7	0	0.020	0.016	0.012	0.009	0.007	0.003	0.002	0.001
2008	77.5	0	0.021	0.018	0.012	0.007	0.006	0.004	0.002	0.001
2009	89.8	0	0.029	0.015	0.012	0.010	0.008	0.004	0.002	0.001
2010	91.9	0	0.021	0.015	0.014	0.010	0.007	0.004	0.002	0.001

Table 88: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Macarthur

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	53.1	0	0.015	0.012	0.008	0.006	0.004	0.003	0.002	0.001
2006	93.2	0	0.010	0.008	0.006	0.005	0.004	0.002	0.001	0.001
2007	90.9	0	0.015	0.011	0.010	0.006	0.005	0.003	0.002	0.001
2008	92.1	0	0.015	0.013	0.009	0.006	0.004	0.003	0.001	0.001
2009	91.6	0	0.010	0.009	0.007	0.006	0.004	0.003	0.002	0.001
2010	92.9	0	0.010	0.006	0.006	0.005	0.004	0.002	0.001	0.001

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 89: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Richmond

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	84.7	0	0.012	0.010	0.007	0.005	0.004	0.002	0.001	0.001
2002	93.3	0	0.028	0.009	0.008	0.006	0.004	0.003	0.001	0.001
2003	93.0	0	0.012	0.010	0.009	0.006	0.004	0.003	0.001	0.001
2004	89.7	0	0.021	0.012	0.009	0.007	0.005	0.002	0.001	0.001
2005	92.8	0	0.015	0.009	0.007	0.006	0.004	0.002	0.001	0.001
2006	92.0	0	0.018	0.011	0.009	0.006	0.004	0.002	0.001	0.001
2007	91.0	0	0.024	0.008	0.007	0.005	0.004	0.002	0.001	0.000
2008	72.0	0	0.015	0.010	0.007	0.005	0.003	0.002	0.001	0.000
2009	89.5	0	0.013	0.010	0.009	0.006	0.004	0.002	0.001	0.000
2010	93.3	0	0.009	0.007	0.006	0.005	0.003	0.002	0.001	0.000

Table 90: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Albion Park[(1)]/Albion Park Sth[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	93.7	0	0.034	0.028	0.024	0.019	0.013	0.008	0.001	0.000
2002[(1)]	57.4	0	0.029	0.028	0.027	0.022	0.016	0.006	0.001	0.000
2003[(1)]	93.7	0	0.035	0.026	0.022	0.016	0.012	0.005	0.001	0.000
2004[(1)]	92.9	0	0.034	0.029	0.027	0.017	0.013	0.005	0.001	0.000
2005[(1)]	4.8	0	0.032	0.032	0.032	0.031	0.030	0.007	0.001	0.000
2006[(2)]	86.7	0	0.038	0.028	0.024	0.019	0.011	0.004	0.001	0.000
2007[(2)]	83.1	0	0.038	0.033	0.031	0.019	0.013	0.006	0.001	0.000
2008[(2)]	93.0	0	0.028	0.026	0.022	0.015	0.011	0.005	0.001	0.000
2009[(2)]	85.4	0	0.031	0.027	0.023	0.018	0.013	0.005	0.001	0.000
2010[(2)]	89.6	0	0.032	0.027	0.023	0.019	0.013	0.005	0.001	0.000

Table 91: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Warrawong

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2000	90.8	0	0.110	0.077	0.039	0.028	0.020	0.010	0.003	0.000
2001	93.1	0	0.162	0.074	0.058	0.042	0.027	0.011	0.003	0.000
2002	94.0	0	0.046	0.031	0.029	0.023	0.019	0.011	0.004	0.000
2003	93.7	0	0.063	0.052	0.040	0.022	0.017	0.009	0.002	0.000
2004	91.4	0	0.088	0.039	0.029	0.021	0.013	0.006	0.002	0.000
2005	91.8	0	0.070	0.032	0.025	0.019	0.014	0.008	0.002	0.000
2006	37.9	0	0.022	0.022	0.020	0.015	0.010	0.004	0.001	0.000

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 92: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Wollongong

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	92.6	0	0.030	0.027	0.021	0.016	0.013	0.008	0.004	0.002
2002	91.1	0	0.039	0.033	0.025	0.019	0.015	0.009	0.005	0.002
2003	93.7	0	0.031	0.025	0.023	0.015	0.013	0.008	0.004	0.002
2004	92.8	0	0.053	0.024	0.018	0.014	0.011	0.006	0.003	0.001
2005	93.0	0	0.038	0.023	0.021	0.015	0.011	0.006	0.003	0.001
2006	94.5	0	0.035	0.020	0.018	0.015	0.012	0.007	0.004	0.001
2007	78.9	0	0.032	0.022	0.020	0.016	0.011	0.007	0.003	0.001
2008	78.2	0	0.021	0.019	0.015	0.012	0.009	0.006	0.002	0.000
2009	75.3	0	0.020	0.016	0.014	0.010	0.007	0.004	0.002	0.000
2010	88.4	0	0.027	0.018	0.015	0.013	0.011	0.006	0.003	0.001

Table 93: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Newcastle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	72.6	0	0.037	0.035	0.029	0.020	0.015	0.008	0.005	0.002
2006	93.3	0	0.034	0.028	0.021	0.017	0.013	0.007	0.004	0.001
2007	44.5	0	0.043	0.032	0.025	0.021	0.014	0.008	0.005	0.003
2008	86.9	0	0.033	0.027	0.024	0.019	0.015	0.010	0.004	0.002
2009	69.7	0	0.039	0.033	0.027	0.021	0.015	0.008	0.005	0.002
2010	84.6	0	0.027	0.022	0.020	0.015	0.012	0.008	0.004	0.002

Table 94: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations
Station: Wallsend

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	86.9	0	0.049	0.037	0.031	0.025	0.021	0.013	0.008	0.004
2002	80.2	0	0.045	0.036	0.028	0.024	0.019	0.012	0.007	0.003
2003	90.3	0	0.047	0.034	0.029	0.023	0.017	0.011	0.006	0.003
2004	90.1	0	0.067	0.042	0.033	0.022	0.016	0.010	0.005	0.002
2005	93.4	0	0.048	0.033	0.027	0.021	0.017	0.009	0.005	0.002
2006	94.5	0	0.058	0.027	0.025	0.021	0.016	0.011	0.005	0.002
2007	83.9	0	0.039	0.032	0.027	0.022	0.018	0.010	0.005	0.002
2008	91.3	0	0.044	0.032	0.026	0.021	0.018	0.011	0.006	0.002
2009	67.2	0	0.044	0.028	0.025	0.019	0.014	0.009	0.005	0.001
2010	70.3	0	0.031	0.022	0.020	0.017	0.014	0.009	0.004	0.001

AAQ NEPM Standard - 0.20 ppm (1-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 95: Statistical summary for SO_2 - 24-hour average concentrations
Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	98.1	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	0.001
2002[(1)]	96.4	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2003[(1)]	95.1	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2004[(1)]	40.7	0	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001
2005[#]										
2006[#]										
2007[(2)]	67.1	0	0.005	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2008[(2)]	89.9	0	0.004	0.003	0.003	0.002	0.001	0.001	0.000	0.000
2009[(2)]	96.4	0	0.003	0.003	0.002	0.002	0.002	0.001	0.000	0.000
2010[(2)]	96.4	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000

Station closed pending relocation.

Table 96: Statistical summary for SO_2 - 24-hour average concentrations
Station: Bringelly

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	98.6	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2002	99.2	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2003	97.3	0	0.002	0.002	0.002	0.001	0.001	0.000	0.000	0.000
2004	94.8	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2005	95.3	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2006	95.3	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2007	86.8	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2008	92.3	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	-0.001
2009	87.1	0	0.003	0.002	0.001	0.001	0.001	0.000	0.000	-0.001
2010	85.8	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000

Table 97: Statistical summary for SO_2 - 24-hour average concentrations
Station: Chullora

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	71.8	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	0.000
2006	98.4	0	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001
2007	89.3	0	0.004	0.004	0.003	0.003	0.002	0.001	0.001	0.000
2008	80.9	0	0.005	0.004	0.003	0.002	0.002	0.001	0.001	0.000
2009	94.5	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	0.000
2010	95.9	0	0.004	0.004	0.003	0.003	0.002	0.001	0.001	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 98: Statistical summary for SO_2 - 24-hour average concentrations
Station: Macarthur

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	55.3	0	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000
2006	97.3	0	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000
2007	94.8	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2008	97.0	0	0.004	0.003	0.003	0.002	0.002	0.001	0.000	0.000
2009	95.9	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2010	97.0	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000

Table 99: Statistical summary for SO_2 - 24-hour average concentrations
Station: Richmond

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	88.8	0	0.010	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2002	97.5	0	0.004	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2003	97.0	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2004	92.9	0	0.004	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2005	96.7	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2006	95.9	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2007	94.5	0	0.004	0.002	0.002	0.001	0.001	0.000	0.000	0.000
2008	74.9	0	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2009	93.7	0	0.004	0.003	0.002	0.001	0.001	0.000	0.000	0.000
2010	97.5	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000

Table 100: Statistical summary for SO_2 - 24-hour average concentrations
Station: Albion Park[(1)]/Albion Park Sth[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	98.1	0	0.013	0.009	0.007	0.005	0.003	0.002	0.000	0.000
2002[(1)]	60.0	0	0.009	0.009	0.007	0.006	0.004	0.001	0.000	0.000
2003[(1)]	98.9	0	0.009	0.008	0.006	0.004	0.003	0.001	0.000	0.000
2004[(1)]	97.0	0	0.009	0.007	0.006	0.004	0.003	0.001	0.000	0.000
2005[(1)]	4.9	0	0.011	0.011	0.011	0.010	0.007	0.002	0.000	0.000
2006[(2)]	89.3	0	0.010	0.008	0.007	0.004	0.003	0.001	0.000	0.000
2007[(2)]	83.8	0	0.014	0.011	0.008	0.004	0.003	0.001	0.000	0.000
2008[(2)]	97.0	0	0.08	0.006	0.005	0.004	0.003	0.002	0.000	0.000
2009[(2)]	88.5	0	0.012	0.009	0.008	0.006	0.004	0.002	0.000	0.000
2010[(2)]	97.8	0	0.011	0.010	0.008	0.006	0.003	0.001	0.000	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 101: Statistical summary for SO_2 - 24-hour average concentrations
Station: Warrawong

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2000	93.7	0	0.009	0.007	0.006	0.005	0.003	0.002	0.000	0.000
2001	97.3	0	0.013	0.010	0.009	0.007	0.005	0.002	0.000	0.000
2002	98.6	0	0.009	0.006	0.006	0.005	0.004	0.002	0.001	0.000
2003	98.4	0	0.011	0.009	0.007	0.005	0.003	0.002	0.000	0.000
2004	95.4	0	0.012	0.007	0.006	0.004	0.003	0.001	0.000	0.000
2005	96.7	0	0.009	0.006	0.005	0.004	0.003	0.002	0.000	0.000
2006	39.2	0	0.007	0.006	0.005	0.003	0.002	0.001	0.000	0.000

Table 102: Statistical summary for SO_2 - 24-hour average concentrations
Station: Wollongong

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	95.9	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2002	95.3	0	0.008	0.007	0.006	0.004	0.003	0.002	0.001	0.000
2003	98.4	0	0.006	0.005	0.005	0.003	0.003	0.001	0.001	0.000
2004	97.0	0	0.015	0.007	0.005	0.003	0.002	0.001	0.001	0.000
2005	97.5	0	0.006	0.006	0.003	0.003	0.002	0.001	0.001	0.000
2006	98.9	0	0.007	0.005	0.004	0.003	0.002	0.001	0.001	0.000
2007	79.2	0	0.008	0.006	0.005	0.003	0.002	0.002	0.001	0.000
2008	79.8	0	0.007	0.004	0.003	0.003	0.002	0.001	0.000	-0.001
2009	73.4	0	0.004	0.003	0.003	0.002	0.002	0.001	0.000	-0.001
2010	92.9	0	0.008	0.005	0.004	0.002	0.002	0.001	0.000	0.000

Table 103: Statistical summary for SO_2 - 24-hour average concentrations
Station: Newcastle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2005	75.3	0	0.008	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2006	97.3	0	0.009	0.005	0.005	0.004	0.003	0.002	0.001	0.000
2007	45.8	0	0.012	0.012	0.007	0.005	0.003	0.002	0.001	0.000
2008	90.2	0	0.008	0.006	0.006	0.004	0.003	0.002	0.001	0.000
2009	73.4	0	0.010	0.008	0.006	0.004	0.004	0.002	0.001	0.000
2010	91.8	0	0.005	0.005	0.004	0.004	0.003	0.002	0.001	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

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Table 104: Statistical summary for SO_2 - 24-hour average concentrations
Station: Wallsend

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	89.6	0	0.013	0.009	0.008	0.006	0.004	0.003	0.001	0.001
2002	82.5	0	0.011	0.008	0.007	0.006	0.004	0.003	0.002	0.001
2003	93.7	0	0.010	0.008	0.005	0.004	0.003	0.002	0.001	0.001
2004	92.9	0	0.014	0.008	0.006	0.004	0.003	0.002	0.001	0.001
2005	97.5	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2006	98.9	0	0.009	0.007	0.005	0.004	0.003	0.002	0.001	0.000
2007	83.6	0	0.007	0.006	0.006	0.005	0.004	0.002	0.001	0.000
2008	95.4	0	0.007	0.006	0.006	0.005	0.004	0.002	0.001	0.001
2009	68.2	0	0.007	0.006	0.006	0.004	0.003	0.002	0.001	0.000
2010	74.2	0	0.007	0.005	0.004	0.003	0.003	0.002	0.001	0.000

AAQ NEPM Standard - 0.08 ppm (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Particles as PM_{10}

Statistical summary

Table 105: Statistical summary for PM_{10} - 24-hour average concentrations (2010)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles ($\mu g/m^3$)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	97.3	41.1	37.5	33.9	29.1	23.7	18.5	14.4	10.7
Chullora	98.6	42.1	39.1	35.6	30.7	26.6	21.4	16.9	12.9
Liverpool	97.3	41.1	35.3	33.0	29.9	26.2	20.4	16.2	12.0
Macarthur	99.5	**58.7**	35.7	30.9	26.8	21.5	16.7	12.5	9.5
Oakdale	99.5	33.3	29.3	27.9	23.3	18.1	13.4	9.2	6.6
Prospect	97.5	40.1	31.7	30.1	26.7	22.8	18.7	14.9	11.2
Richmond	96.2	37.0	30.2	26.9	24.6	20.6	15.9	12.0	9.2
Rozelle	98.9	37.6	31.1	29.3	26.8	24.3	19.6	15.6	12.1
Illawarra									
Albion Park Sth	96.7	41.8	37.2	35.6	29.0	24.7	18.4	11.6	8.6
Kembla Grange	98.6	47.5	42.7	39.5	33.4	28.4	22.7	16.2	11.7
Wollongong	95.1	49.6	44.2	40.2	31.9	28.3	22.4	15.8	12.1
lower Hunter									
Beresfield	97.0	50.0	37.7	32.1	28.3	24.7	20.0	15.4	12.3
Newcastle	96.2	**57.1**	38.7	34.7	30.3	27.3	23.1	17.9	13.7
Regional									
Albury	99.5	**60.8**	45.1	31.6	24.1	19.4	14.6	11.2	8.6
Bathurst	98.6	43.3	32.6	26.7	21.2	18.5	12.5	7.9	5.0
Tamworth	98.4	29.1	26.5	24.6	21.8	18.4	14.7	11.2	8.3
Wagga Wagga	97.0	**64.9**	52.1	48.5	38.7	29.0	21.5	15.4	10.0

AAQ NEPM Standard – 50 $\mu g/m^3$ (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 106: Maximum 24-hour average concentrations for PM_{10} (µg/m^3)

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Blacktown/ Prospect*	**127.4**	**117.7**	**187.8**	44.1			46.3*	41.8*	**1680.3***	40.1*
Bringelly	**98.4**	**118.6**	**275.1**	**62.5**	**54.5**	**72.2**	**51.0**	**62.7**	**1683.9**	41.1
Chullora			**213.7**	**55.8**	**50.7**	**66.1**	**66.5**	44.3	**1474.7**	42.1
Liverpool	**63.2**	**126.3**	**283.3**	**62.1**	**55.5**	**75.2**	**53.1**	**53.8**	**1579.8**	41.1
Macarthur				**60.6**	**53.2**	**92.3**	**53.1**	**65.5**	**1146.3**	**58.7**
Oakdale				41.3	42.3	**56.5**	49.2	**68.2**	**1528.3**	33.3
Richmond	**120.5**	**127.3**	**196.4**	46.6	47.4	**63.1**	43.0	39.0	**1637.3**	37.0
Rozelle			38.1	**54.1**	46.8	**50.3**	**54.4**	43.1	**1562.8**	37.6
Illawarra										
Albion Park Sth						**61.4**	**53.8**	**96.1**	**1359.6**	41.8
Kembla Grange				**58.8**	**60.5**	**86.0**	**59.2**	**100.8**	**1174.0**	47.5
Wollongong	**68.1**	**75.6**	**280.5**	49.0	**56.5**	**63.3**	**58.5**	**78.3**	**1145.4**	49.6
lower Hunter										
Beresfield	**82.0**	**165.6**	**87.0**	**53.1**	**53.1**	**51.9**	**64.0**	**59.9**	**1999.0**	50.0
Newcastle				46.7	48.3	**51.2**	**58.1**	**54.4**	**2426.8**	**57.1**
Regional										
Albury	29.8	**86.2**	**940.2**	**56.0**	**56.9**	**213.0**	**212.8**	**124.8**	**249.7**	**60.8**
Bathurst	35.8	**256.7**	**622.3**	**68.5**	44.9	**59.6**	**162.8**	**63.0**	**2114.4**	43.3
Tamworth	32.6	**197.1**	**241.6**	**56.2**	**88.7**	47.8	48.8	**100.4**	**1791.4**	29.1
Wagga Wagga	**69.6**	**193.2**	**970.0**	**109.0**	**161.9**	**188.3**	**110.3**	**294.9**	**297.4**	**64.9**

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 107: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Blacktown[(1)]/Prospect[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001[(1)]	93.2	3	**127.4**	**51.7**	42.5	35.7	32.2	25.0	18.8	14.0
2002[(1)]	93.4	**11**	**117.7**	**89.2**	**66.9**	44.9	33.8	25.2	18.5	14.6
2003[(1)]	94.8	5	**187.8**	**69.4**	43.6	34.8	29.3	21.8	16.9	12.7
2004[(1)]	35.8	0	44.1	43.4	41.9	39.2	33.7	27.4	22.6	18.1
2005[#]										
2006[#]										
2007[(2)]	82.7	0	46.3	43.3	41.6	33.4	28.1	21.9	16.8	12.4
2008[(2)]	88.5	0	41.8	39.6	35.0	32.6	27.5	21.0	16.4	12.8
2009[(2)]	96.4	**11**	**1680.3**	**135.3**	**60.7**	38.9	32.3	24.1	18.2	13.5
2010[(2)]	97.5	0	40.1	31.7	30.1	26.7	22.8	18.7	14.9	11.2

Station closed pending relocation.

Table 108: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Bringelly

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	96.4	5	**98.4**	**62.6**	34.4	28.2	24.7	20.2	16.2	12.5
2002	97.3	**12**	**118.6**	**76.9**	**66.3**	41.3	34.2	25.3	18.4	13.7
2003	97.0	**6**	**275.1**	**56.0**	44.3	34.1	28.7	21.7	16.6	11.8
2004	93.4	2	**62.5**	46.0	41.6	35.1	30.7	24.8	18.9	13.2
2005	92.1	2	**54.5**	46.5	43.5	35.7	30.8	23.8	18.4	13.7
2006	88.8	3	**72.2**	**52.3**	42.6	33.4	29.3	25.0	19.0	14.5
2007	99.5	1	**51.0**	48.5	42.4	33.5	30.3	23.7	16.6	12.0
2008	97.0	1	**62.7**	35.2	33.0	28.6	24.6	19.3	14.4	10.6
2009	94.8	**6**	**1683.9**	**114.8**	47.4	37.1	31.9	22.8	17.0	12.4
2010	97.3	0	41.1	37.5	33.9	29.1	23.7	18.5	14.4	10.7

Table 109: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Chullora[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2003[(2)]	85.2	**11**	**213.7**	**61.1**	**57.5**	47.2	36.0	28.8	21.0	16.3
2004[(2)]	90.7	3	**55.8**	49.8	46.2	39.0	34.2	27.2	21.2	16.1
2005[(2)]	88.8	1	**50.7**	46.1	43.8	38.3	33.6	27.4	20.4	16.3
2006[(2)]	97.0	3	**66.1**	49.2	38.6	34.4	31.1	26.4	21.3	16.5
2007[(2)]	97.5	2	**66.5**	39.4	37.7	34.2	29.2	23.1	18.8	13.4
2008[(2)]	97.0	0	44.3	38.8	36.5	33.0	30.2	23.7	18.6	13.9
2009[(2)]	98.4	**9**	**1474.7**	**121.0**	**58.7**	38.1	32.7	25.0	19.9	14.8
2010[(2)]	98.6	0	42.1	39.1	35.6	30.7	26.6	21.4	16.9	12.9

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 110: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Liverpool

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.5	2	**63.2**	39.1	35.7	30.6	28.5	22.6	18.0	13.2
2002	91.0	**14**	**126.3**	**83.8**	**72.5**	46.0	37.6	27.3	20.0	15.1
2003	90.1	**6**	**283.3**	**62.5**	45.8	37.4	32.3	25.3	19.4	14.8
2004	91.5	1	**62.1**	46.6	44.7	36.8	32.9	26.3	20.6	14.8
2005	96.4	2	**55.5**	48.1	43.7	38.1	32.5	26.5	20.2	15.1
2006	95.9	3	**75.2**	**50.5**	40.8	35.0	31.6	26.3	20.5	16.0
2007	95.3	1	**53.1**	41.3	39.1	35.9	30.3	23.7	17.6	12.8
2008	92.9	1	**53.8**	36.2	33.6	30.1	26.6	21.7	16.9	12.2
2009	93.7	**8**	**1579.8**	**114.8**	**59.5**	38.8	31.7	25.1	18.4	14.3
2010	97.3	0	41.1	35.3	33.0	29.9	26.2	20.4	16.2	12.0

Table 111: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Macarthur

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2004	14.5	1	**60.6**	**60.6**	**53.8**	42.8	38.0	30.9	21.8	15.6
2005	83.6	1	**53.2**	46.6	41.9	35.7	31.3	24.4	18.1	13.7
2006	100.0	4	**92.3**	**53.5**	34.5	31.0	26.2	22.4	15.6	11.5
2007	96.4	1	**53.1**	38.0	36.7	29.8	25.8	20.1	14.7	10.4
2008	99.5	1	**65.5**	33.2	30.7	27.6	23.3	17.5	13.7	9.9
2009	96.7	**7**	**1146.3**	**111.4**	**56.2**	35.5	29.6	21.2	15.5	10.5
2010	99.5	1	**58.7**	35.7	30.9	26.8	21.5	16.7	12.5	9.5

Table 112: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Oakdale

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2004	56.8	0	41.3	36.3	28.7	23.8	19.2	15.7	10.1	6.4
2005	92.9	0	42.3	38.8	32.5	27.7	22.2	16.6	12.4	8.4
2006	96.4	1	**56.5**	35.8	33.9	28.6	23.6	17.8	12.6	8.5
2007	97.3	0	49.2	36.4	32.2	25.4	22.4	16.4	11.2	7.2
2008	96.7	1	**68.2**	33.9	31.0	27.0	21.3	15.5	10.7	7.2
2009	91.2	**6**	**1528.3**	**130.2**	48.4	30.6	25.5	19.5	12.7	7.5
2010	99.5	0	33.3	29.3	27.9	23.3	18.1	13.4	9.2	6.6

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 113: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Richmond

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	84.7	4	**120.5**	**84.4**	34.3	28.1	25.4	20.2	16.2	12.0
2002	94.5	**16**	**127.3**	**106.2**	**84.7**	49.4	35.3	24.4	17.2	12.3
2003	96.7	**7**	**196.4**	**76.0**	**52.8**	35.4	28.8	21.1	15.7	11.3
2004	96.2	0	46.6	41.1	38.4	33.7	29.8	22.5	17.4	12.1
2005	97.0	0	47.4	43.8	37.3	30.3	25.8	20.1	15.3	11.5
2006	97.0	2	**63.1**	44.9	38.0	30.8	27.1	21.5	16.0	12.2
2007	98.4	0	43.0	34.4	33.4	28.6	24.3	18.6	13.6	10.0
2008	98.4	0	39.0	30.9	28.1	24.9	20.2	16.0	11.9	8.9
2009	95.9	**6**	**1637.3**	**121.7**	46.1	32.9	28.0	19.4	13.4	9.6
2010	96.2	0	37.0	30.2	26.9	24.6	20.6	15.9	12.0	9.2

Table 114: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Rozelle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2003	9.9	0	38.1	38.1	38.0	37.2	31.7	22.4	18.7	16.2
2004	92.3	1	**54.1**	43.8	38.8	34.0	30.1	24.6	19.3	14.0
2005	95.1	0	46.8	42.6	39.3	35.2	31.4	24.3	18.8	14.9
2006	94.0	1	**50.3**	45.0	38.8	33.6	29.3	24.7	19.4	15.4
2007	97.5	1	**54.4**	38.2	36.1	30.7	27.1	21.7	17.2	13.2
2008	96.4	0	43.1	34.0	32.6	28.7	26.0	20.6	16.7	12.9
2009	95.3	**8**	**1562.8**	**128.5**	**55.8**	36.1	31.0	24.3	17.8	13.1
2010	98.9	0	37.6	31.1	29.3	26.8	24.3	19.6	15.6	12.1

Table 115: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Albion Park[(1)]/Albion Park Sth[(2)]

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2006[(2)]	85.8	2	**61.4**	42.3	38.6	35.9	29.4	21.7	15.3	10.5
2007[(2)]	88.5	1	**53.8**	42.6	37.8	33.4	28.4	20.8	13.6	8.7
2008[(2)]	97.0	1	**96.1**	40.0	35.3	29.7	25.2	18.2	13.0	9.4
2009[(2)]	99.5	**9**	**1359.6**	**73.0**	**50.7**	38.0	31.6	22.8	15.4	10.1
2010[(2)]	96.7	0	41.8	37.2	35.6	29.0	24.7	18.4	11.6	8.6

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 116: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Kembla Grange

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2004	57.4	1	**58.8**	46.8	43.3	37.0	30.3	21.8	14.9	10.5
2005	97.8	4	**60.5**	**50.8**	46.8	39.1	33.6	23.4	17.1	12.2
2006	99.2	**9**	**86.0**	**69.6**	**54.5**	40.4	34.5	26.0	18.7	13.0
2007	99.5	5	**59.2**	**50.5**	46.6	39.0	33.2	24.3	17.7	12.1
2008	98.6	4	**100.8**	**52.8**	42.0	33.3	30.3	23.3	16.7	11.1
2009	99.2	**14**	**1174.0**	**134.4**	**67.0**	42.5	34.0	25.5	18.0	11.5
2010	98.6	0	47.5	42.7	39.5	33.4	28.4	22.7	16.2	11.7

Table 117: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Wollongong

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	97.3	5	**68.1**	**52.0**	45.6	37.0	31.0	22.6	16.7	12.0
2002	94.2	**11**	**75.6**	**65.9**	**57.3**	44.6	34.4	25.6	18.3	13.7
2003	98.1	**8**	**280.5**	**61.8**	**51.3**	34.7	29.3	21.4	16.8	12.4
2004	97.0	0	49.0	46.2	42.3	36.7	30.6	23.4	17.4	12.2
2005	97.3	1	**56.5**	45.6	41.9	34.5	29.8	23.6	16.7	12.6
2006	96.4	4	**63.3**	**52.6**	46.7	37.5	32.3	25.1	18.5	13.0
2007	95.3	3	**58.5**	49.3	42.7	37.8	31.8	24.7	18.3	13.1
2008	94.5	1	**78.3**	41.0	36.8	31.2	28.7	21.5	16.3	12.1
2009	95.9	**6**	**1145.4**	**107.0**	49.5	40.3	34.7	24.5	18.8	12.6
2010	95.1	0	49.6	44.2	40.2	31.9	28.3	22.4	15.8	12.1

Table 118: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Beresfield

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	90.1	4	**82.0**	**51.6**	44.9	39.3	32.5	25.8	19.9	15.1
2002	80.5	**25**	**165.6**	**103.4**	**71.2**	**56.7**	47.3	33.2	21.7	16.1
2003	91.2	5	**87.0**	**60.7**	47.5	34.0	29.0	22.7	17.5	13.1
2004	87.2	1	**53.1**	47.2	43.8	39.2	33.1	24.9	19.3	14.0
2005	95.9	1	**53.1**	44.3	41.1	37.0	31.7	25.2	18.6	14.6
2006	96.4	2	**51.9**	44.5	43.2	36.8	34.2	26.7	18.7	14.6
2007	90.1	5	**64.0**	**55.1**	49.3	41.8	32.1	25.2	18.4	13.1
2008	95.4	5	**59.9**	**52.5**	38.3	32.3	27.3	21.5	16.9	13.4
2009	98.6	**15**	**1999.0**	**174.3**	**70.6**	47.7	35.3	26.2	18.4	14.2
2010	97.0	0	50.0	37.7	32.1	28.3	24.7	20.0	15.4	12.3

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 119: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Newcastle

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2004	19.4	0	46.7	46.6	46.6	39.4	34.1	27.3	21.7	17.0
2005	81.6	0	48.3	41.7	39.3	35.7	31.8	26.4	20.9	16.5
2006	97.3	1	**51.2**	43.2	38.1	34.2	30.8	25.6	20.5	15.8
2007	47.1	3	**58.1**	**56.8**	49.9	39.5	33.6	26.8	21.5	17.2
2008	93.2	2	**54.4**	44.2	39.6	34.4	31.4	24.8	19.1	15.1
2009	93.2	**13**	**2426.8**	**119.5**	**71.2**	44.9	37.0	28.1	22.3	16.5
2010	96.2	1	**57.1**	38.7	34.7	30.3	27.3	23.1	17.9	13.7

Table 120: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Albury

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	31.8	0	29.8	27.8	25.3	22.7	20.5	17.2	12.2	9.6
2002	82.5	5	**86.2**	**62.5**	45.2	38.9	31.0	22.9	16.0	12.9
2003	80.8	**29**	**940.2**	**272.5**	**201.3**	**95.2**	49.3	23.1	14.2	9.7
2004	77.3	2	**56.0**	45.0	41.0	36.7	32.2	18.6	13.2	9.9
2005	90.1	3	**56.9**	**50.4**	41.0	36.2	30.7	20.4	14.3	10.9
2006	87.9	**14**	**213.0**	**114.8**	**75.8**	48.1	35.4	24.0	17.8	13.3
2007	91.2	**11**	**212.8**	**117.3**	**91.5**	44.9	31.4	22.3	15.2	11.0
2008	96.4	**8**	**124.8**	**67.8**	**53.5**	40.2	29.7	20.7	14.3	9.9
2009	96.7	**15**	**249.7**	**144.0**	**102.0**	39.0	28.5	19.3	14.0	10.1
2010	99.5	2	**60.8**	45.1	31.6	24.1	19.4	14.6	11.2	8.6

Table 121: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Bathurst

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	29.9	0	35.8	35.5	34.9	32.2	28.7	22.5	16.5	12.3
2002	91.5	**16**	**256.7**	**98.3**	**71.9**	48.9	35.9	25.0	16.7	12.5
2003	90.4	**12**	**622.3**	**122.2**	**74.1**	34.8	27.9	17.2	13.0	8.9
2004	88.5	4	**68.5**	**54.9**	47.0	39.0	33.0	24.4	15.3	9.8
2005	93.2	0	44.9	40.8	36.3	30.4	25.4	18.6	12.9	8.9
2006	98.6	3	**59.6**	46.0	44.3	35.2	28.6	22.3	15.4	11.5
2007	95.1	2	**162.8**	48.6	38.9	32.0	26.6	19.2	13.5	9.2
2008	94.8	1	**63.0**	40.8	35.9	28.8	24.1	16.9	12.3	8.8
2009	97.8	**12**	**2114.4**	**122.4**	**69.8**	36.9	26.8	20.3	13.8	9.0
2010	98.6	0	43.3	32.6	26.7	21.2	18.5	12.5	7.9	5.0

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Table 122: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Tamworth

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	97.0	0	32.6	26.9	24.8	22.6	20.3	16.6	12.9	10.0
2002	99.2	**7**	**197.1**	**70.1**	**51.5**	41.3	33.7	23.2	17.5	13.0
2003	92.9	**7**	**241.6**	**70.7**	**51.4**	34.7	25.8	19.7	15.1	11.4
2004	79.2	2	**56.2**	47.0	40.4	34.8	31.0	24.8	19.4	15.4
2005	68.2	2	**88.7**	42.9	33.7	29.8	27.4	20.6	14.8	10.6
2006	79.2	0	47.8	39.0	36.7	29.3	26.7	21.3	15.0	11.0
2007	73.7	0	48.8	42.3	34.5	30.3	26.2	19.4	14.7	10.1
2008	85.8	3	**100.4**	**52.0**	40.7	30.5	23.8	18.7	14.0	10.5
2009	96.7	**17**	**1791.4**	**235.9**	**120.7**	47.0	33.8	22.8	15.7	11.4
2010	98.4	0	29.1	26.5	24.6	21.8	18.4	14.7	11.2	8.3

Table 123: Statistical summary for PM_{10} - 24-hour average concentrations
Station: Wagga Wagga

Year	Data availability rates (%)	Number of Exceedances (days)	Maximum value (ug/m3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	31.2	2	**69.6**	**60.7**	43.0	32.6	29.0	22.7	17.0	12.2
2002	99.2	**34**	**193.2**	**123.3**	**101.9**	**60.7**	48.7	33.6	24.6	17.1
2003	87.4	**21**	**970.0**	**133.9**	**101.9**	**56.7**	44.6	28.9	19.3	12.8
2004	91.0	**28**	**109.0**	**70.5**	**68.5**	**61.3**	47.0	33.2	21.5	13.8
2005	90.7	**27**	**161.9**	**80.9**	**72.4**	**59.5**	46.4	30.4	19.8	14.1
2006	95.6	**37**	**188.3**	**110.0**	**86.8**	**61.1**	**50.7**	36.2	24.9	16.9
2007	97.5	**34**	**110.3**	**82.0**	**75.2**	**61.0**	47.5	33.0	21.7	14.8
2008	93.7	**23**	**294.9**	**70.6**	**62.6**	**53.2**	45.1	28.4	21.0	14.5
2009	82.5	**21**	**297.4**	**214.4**	**112.3**	**55.9**	46.2	30.6	19.8	12.4
2010	97.0	**6**	**64.9**	**52.1**	48.5	38.7	29.0	21.5	15.4	10.0

AAQ NEPM Standard – 50 µg/m^3 (24-hour average)

Bold font indicates values that exceed the AAQ NEPM standard

Particles as $PM_{2.5}$

Statistical summary

Table 124: Statistical summary for $PM_{2.5}$ - Daily 24-hour average concentrations (2010) – continuous TEOM method

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (µg/m^3)	Percentiles (µg/m^3)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Chullora	93.4	24.2	17.7	15.2	11.9	9.9	7.3	5.0	3.4
Earlwood	95.9	22.5	16.5	14.2	11.5	9.7	7.3	5.0	3.4
Liverpool	95.9	21.8	17.8	15.5	13.2	10.9	8.1	5.5	3.8
Richmond	97.0	20.8	13.7	12.2	9.2	7.9	5.7	3.5	2.1
Illawarra									
Wollongong	92.9	23.5	15.0	13.8	11.0	9.2	6.3	4.2	3.0
lower Hunter									
Beresfield	97.3	**25.9**	15.1	13.3	11.7	9.9	7.5	5.3	4.0
Wallsend	92.9	18.8	11.9	10.7	8.8	7.4	5.7	4.2	3.0

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data-uses USEPA factors of A=0 and B=1.00

Trend data

Annual averages and annual maximum 24-hour averages for all stations are given below.

Table 125: Maximum 24-hour average concentrations for $PM_{2.5}$ (µg/m^3) – continuous TEOM method

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Chullora			**81.2**	23.5	**25.4**	**32.8**	20.5	19.5	**183.2**	24.2
Earlwood	**76.4**	**50.5**	**35.3**	20.1	**26.8**	**29.0**	19.8	18.3	**186.7**	22.5
Liverpool	**112.2**	**78.7**	**45.9**	**38.9**	**30.8**	**48.1**	23.0	**32.1**	**268.2**	21.8
Richmond	**95.5**	**95.4**	**57.2**	23.3	22.7	**31.6**	21.1	17.7	**192.3**	20.8
Illawarra										
Warrawong	19.8	**83.5**	**152.6**	23.6	24.0	15.0				
Wollongong	**46.7**	**86.2**	**106.0**	22.6	22.0	**26.6**	22.5	14.7	**241.0**	23.5
lower Hunter										
Beresfield	**62.5**	**47.0**	**42.8**	**27.8**	19.5	24.9	23.0	16.9	**230.9**	**25.9**
Wallsend	**51.7**	**55.6**	**30.2**	23.5	18.0	**25.6**	18.2	22.7	**415.6**	18.8

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data-uses USEPA factors of A=0 and B=1.00

$PM_{2.5}$ 24 hour average

$PM_{2.5}$ TEOM 24 hour daily averages reported from 2009 onwards will differ from those reported in previous NEPM reports as the US EPA PM_{10} equivalence factor has been removed from all of the data, whereas in the past it has been left in.

Table 126: Annual average concentrations for $PM_{2.5}$ (µg/m^3) - continuous TEOM method

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Chullora			**11.0**	**8.6**	7.6	7.2	6.4	5.9	7.1	5.7
Earlwood	**8.3**	**9.5**	7.8	7.6	7.1	6.9	5.9	5.4	6.8	5.6
Liverpool	**8.5**	**11.8**	**10.3**	**9.2**	**8.3**	**8.8**	7.2	6.4	**8.2**	6.3
Richmond	7.1	**9.0**	6.8	6.4	5.8	5.9	6.4	7.3	5.8	4.2
Illawarra										
Warrawong	6.6	**9.4**	**8.7**	**8.1**	7.4	6.0				
Wollongong	6.1	**8.3**	7.3	6.6	6.3	6.3	5.9	5.2	7.0	5.0
lower Hunter										
Beresfield	**9.1**	**10.4**	6.1	7.7	6.8	6.8	6.3	5.9	**8.4**	5.9
Wallsend	6.9	**8.1**	6.6	6.7	6.5	6.4	5.8	5.8	8.0	4.6

AAQ NEPM advisory reporting standard - 8µg/m^3 (annual average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=0 and B=1.00

Statistical trends

Table 127: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Chullora

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2003	70.4	7	**81.2**	**36.5**	**25.3**	19.2	16.8	13.1	9.7	7.6
2004	89.6	0	23.5	20.0	18.5	15.9	14.0	10.9	7.9	5.7
2005	93.2	2	**25.4**	19.5	17.2	15.1	12.9	9.2	6.7	5.0
2006	94.2	2	**32.8**	16.6	14.6	13.1	11.4	8.8	6.4	4.8
2007	65.5	0	20.5	17.4	16.8	13.4	11.9	8.1	5.4	3.7
2008	96.7	0	19.5	16.6	14.4	11.8	9.9	7.6	5.4	3.7
2009	98.6	3	**183.2**	18.9	17.2	14.0	11.1	8.5	5.9	3.9
2010	93.4	0	24.2	17.7	15.2	11.9	9.9	7.3	5.0	3.4

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data-uses USEPA factors of A=0 and B=1.00

Table 128: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Earlwood

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	93.4	6	**76.4**	**48.7**	22.1	17.4	15.0	9.8	6.6	4.4
2002	98.9	9	**50.5**	**47.1**	**28.6**	19.9	17.3	11.7	7.8	4.9
2003	98.6	5	**35.3**	**30.4**	24.2	16.3	14.3	9.7	6.5	4.5
2004	96.2	0	20.1	19.5	18.0	15.1	13.1	10.1	6.8	4.5
2005	98.9	2	**26.8**	20.1	18.7	14.0	12.2	9.1	6.1	4.4
2006	98.6	2	**29.0**	17.8	15.1	13.1	11.6	8.3	6.4	4.4
2007	96.7	0	19.8	16.8	15.6	12.2	10.5	7.8	5.2	3.3
2008	98.6	0	18.3	15.3	14.7	11.3	9.6	7.2	4.9	3.2
2009	75.6	1	**186.7**	22.5	18.9	13.9	11.3	8.2	5.2	3.4
2010	95.9	0	22.5	16.5	14.2	11.5	9.7	7.3	5.0	3.4

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data-uses USEPA factors of A=0 and B=1.00

Table 129: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Liverpool

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	97.8	6	**112.2**	**52.4**	19.8	16.2	13.8	10.0	7.0	4.6
2002	96.7	19	**78.7**	**46.8**	**35.0**	**25.9**	22.2	14.6	9.6	6.3
2003	65.8	6	**45.9**	**42.9**	**29.4**	20.7	17.2	13.4	8.8	6.3
2004	85.5	4	**38.9**	**27.3**	23.3	17.2	15.8	11.8	8.5	5.1
2005	91.2	2	**30.8**	24.2	22.0	17.2	15.3	10.9	7.3	4.9
2006	98.6	3	**48.1**	22.2	18.5	15.8	14.1	11.0	8.3	5.9
2007	94.8	0	23.0	19.4	18.3	15.2	12.1	9.2	6.6	4.3
2008	92.6	1	**32.1**	16.6	14.9	12.2	10.6	8.3	5.8	3.9
2009	95.1	3	**268.2**	**25.2**	19.9	15.0	12.9	9.7	6.7	4.2
2010	95.9	0	21.8	17.8	15.5	13.2	10.9	8.1	5.5	3.8

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data-uses USEPA factors of A=0 and B=1.00

Table 130: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Richmond

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	58.9	3	**95.5**	**64.5**	18.4	13.4	10.9	7.6	5.6	3.4
2002	64.4	9	**95.4**	**56.0**	**41.6**	22.1	15.1	10.3	6.8	3.8
2003	95.9	6	**57.2**	**39.9**	24.5	15.7	11.7	7.8	5.2	3.4
2004	96.7	0	23.3	20.1	17.7	14.2	11.5	8.5	5.7	3.4
2005	83.8	0	22.7	15.7	14.5	12.4	10.8	7.3	4.9	3.3
2006	84.9	1	**31.6**	17.4	13.1	10.9	9.3	7.4	5.3	3.8
2007	12.9	0	21.1	18.6	16.0	13.6	9.5	7.7	6.0	4.3
2008	98.9	0	17.7	14.6	13.7	12.3	10.5	8.6	6.9	5.6
2009	89.3	3	**192.3**	23.0	16.9	11.5	9.8	6.7	4.4	2.8
2010	97.0	0	20.8	13.7	12.2	9.2	7.9	5.7	3.5	2.1

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data-uses USEPA factors of A=0 and B=1.00

Table 131: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Warrawong

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2000	97.3	2	**30.8**	17.9	15.8	12.1	9.9	7.3	5.1	3.6
2001	95.1	0	19.8	18.1	17.2	14.5	11.7	8.8	5.7	3.6
2002	96.7	10	**83.5**	**42.4**	**30.3**	21.7	17.4	11.9	7.4	4.9
2003	98.4	4	**152.6**	**26.0**	21.4	17.7	14.4	10.9	7.5	5.0
2004	94.5	0	23.6	21.0	18.6	17.0	14.4	10.8	7.2	4.8
2005	94.5	0	24.0	21.0	18.7	15.7	13.2	9.7	6.5	4.3
2006	40.5	0	15.0	15.0	14.0	12.5	10.8	8.3	5.9	3.3

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data-uses USEPA factors of A=0 and B=1.00

Table 132: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Wollongong

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	96.2	2	**46.7**	17.8	16.1	14.0	11.4	7.7	5.0	3.2
2002	95.6	11	**86.2**	**46.4**	**26.1**	21.9	15.0	10.3	6.3	4.0
2003	97.0	5	**106.0**	**30.9**	20.8	15.2	12.6	8.6	6.0	4.2
2004	97.0	0	22.6	19.1	17.6	14.5	12.3	8.9	5.9	3.6
2005	97.8	0	22.0	18.0	16.6	13.0	11.9	8.2	5.5	3.8
2006	100.0	2	26.6	17.4	14.4	12.5	11.2	8.4	5.7	3.6
2007	98.4	0	22.5	18.5	16.3	13.7	10.8	7.7	5.2	3.2
2008	94.0	0	14.7	14.2	13.0	10.7	9.3	7.0	4.8	3.0
2009	96.2	3	**241.0**	23.0	19.3	15.0	12.0	8.3	5.6	3.4
2010	92.9	0	23.5	15.0	13.8	11.0	9.2	6.3	4.2	3.0

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data-uses USEPA factors of A=0 and B=1.00

Table 133: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Beresfield

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	68.8	5	**62.5**	**30.9**	**26.0**	18.1	15.4	11.8	7.9	5.0
2002	95.1	19	**47.0**	**42.8**	**36.3**	**26.1**	18.7	12.4	8.2	5.5
2003	90.7	3	**42.8**	**26.7**	19.8	14.3	10.7	7.7	5.1	3.1
2004	90.4	1	**27.8**	20.3	19.6	16.5	13.3	9.8	7.1	4.6
2005	93.7	0	19.5	17.8	16.3	14.9	12.2	8.8	5.9	4.1
2006	98.9	0	24.9	17.8	15.5	13.3	11.4	8.5	5.9	4.3
2007	86.0	0	23.0	17.2	15.9	13.6	11.5	8.4	5.5	3.5
2008	92.1	0	16.9	15.1	13.9	11.7	9.7	7.7	5.7	3.6
2009	94.0	5	**230.9**	**34.4**	21.5	16.3	13.6	9.6	6.6	4.7
2010	97.3	1	**25.9**	15.1	13.3	11.7	9.9	7.5	5.3	4.0

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=0 and B=1.00

Table 134: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Wallsend

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.8	4	**51.7**	**30.3**	22.3	14.6	12.2	8.3	5.4	3.9
2002	85.5	9	**55.6**	**40.5**	**29.4**	19.5	14.2	9.5	6.1	4.2
2003	88.2	2	**30.2**	22.9	18.5	13.4	11.1	8.7	5.5	3.8
2004	87.4	0	23.5	17.4	15.2	12.8	11.0	8.5	5.8	4.2
2005	95.9	0	18.0	16.5	15.3	13.3	11.3	8.3	5.8	4.1
2006	99.2	1	**25.6**	16.6	14.5	12.1	10.5	8.2	5.8	4.1
2007	92.3	0	18.2	15.2	14.9	12.3	10.0	7.5	5.1	3.3
2008	87.7	0	22.7	18.3	14.7	12.0	10.1	7.5	5.1	3.4
2009	90.7	5	**415.6**	**38.4**	20.3	14.3	12.5	8.1	5.4	3.8
2010	92.9	0	18.8	11.9	10.7	8.8	7.4	5.7	4.2	3.0

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=0 and B=1.00

Statistical summary

Table 135: Statistical summary for $PM_{2.5}$ equivalency study- Daily 24-hour average concentrations (2010) – FRM method

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (µg/m^3)	Percentiles (µg/m^3)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Chullora	83.8	**28.2**	21.9	16.6	12.8	11.0	7.5	5.8	4.2

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* data availability rates are based on a one day in three sampling regime.

** Please note that sampling at the Richmond site ceased at the end of 2007

*** Please note that sampling at Chullora was not conducted between the 15th - 30th Dec due to technical problems

Trend data

Annual averages and annual maximum 24-hour averages for all stations are given below. Please note that monitoring as part of this study did not begin until February 2005, and monitoring ceased at Richmond in September 2007 due to technical issues. Please note that the data availability rates are based on a one day in three sampling regime.

Table 136: Maximum 24-hour average concentrations for $PM_{2.5}$ equivalency study (µg/m^3) – FRM method

Region/ Performance monitoring Station	2005	2006	2007	2008	2009	2010
Sydney						
Chullora	**27.8**	**30.0**	19.2	22.1	**27.5**	**28.2**
Richmond	**28.8**	**45.8**	18.3			

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* data availability rates are based on a one day in three sampling regime.

** Please note that monitoring at Richmond ceased in 2007

*** Please note that sampling at Chullora was not conducted between the 15th - 30th Dec due to technical problems

Table 137: Annual average concentrations for $PM_{2.5}$ equivalency study (µg/m^3) – FRM method

Region/ Performance monitoring Station	2005	2006	2007	2008	2009	2010
Sydney						
Chullora	7.3	6.8	6.7	6.1	6.7	6.5
Richmond	6.4	6.5	6.6			

AAQ NEPM advisory reporting standard - 8µg/m^3 (annual average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* data availability rates are based on a one day in three sampling regime.

** Please note that monitoring at Richmond ceased in 2007

*** Please note that sampling at Chullora was not conducted between the 15th - 30th Dec due to technical problems

Table 138: Statistical summary for $PM_{2.5}$ equivalency study- 24-hour average concentrations – FRM method

Station: Chullora

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2005	72.1	1	**27.8**	19.1	17.6	13.0	11.7	9.2	6.7	4.6
2006	84.4	1	**30.0**	20.3	16.6	13.3	11.2	8.3	5.8	4.1
2007	80.3	0	19.2	15.5	14.6	13.8	11.4	8.2	5.8	4.0
2008	88.5	0	22.1	19.2	14.3	11.5	10.5	7.2	5.4	4.0
2009	87.6	2	**27.5**	**26.7**	19.1	13.1	11.3	9.1	5.4	3.8
2010	83.8	1	**28.2**	21.9	16.6	12.8	11.0	7.5	5.8	4.2

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* data availability rates are based on a one day in three sampling regime.

*** Please note that sampling at Chullora was not conducted between the 15th - 30th Dec due to technical problems

Table 139: Statistical summary for $PM_{2.5}$ equivalency study- 24-hour average concentrations – FRM method

Station: Richmond

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2005	69.7	2	**28.8**	**27.7**	21.3	13.3	11.5	7.5	5.0	3.3
2006	68.9	1	**45.8**	19.3	13.0	11.3	10.6	8.0	5.8	3.6
2007	49.2	0	18.3	16.8	15.7	15.4	11.8	8.8	5.6	3.6

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* data availability rates are based on a one day in three sampling regime.

** Please note that sampling at the Richmond site ceased at the end of 2007

References

Appendix A

Historically, $PM_{2.5}$ data collected by TEOM and reported in NSW ANEPM Compliance Reports until 2008 were reported with the US EPA internal PM_{10} FEM adjustment factors applied.

In the case of PM_{10}, an internal linear correction of y = 3.0 + 1.03x is automatically applied to obtain US EPA equivalence against the PM_{10} Federal Reference Measure (FRM). In this adjustment, y is the adjusted PM_{10} TEOM value (the equivalent FRM value), x is the actual PM_{10} TEOM reading, 1.03 is the slope of the linear correction and 3.0 is the y-intercept. This internal correction is only intended to apply to PM_{10} particle data and with this internal adjustment, PM_{10}TEOMs are designated by the US EPA as a Federal Equivalent Method (FEM).

In the absence of any equivalency factors for $PM_{2.5}$, a conservative decision was made to retain the internal FEM adjustment factors until such time as equivalency issues for $PM_{2.5}$ TEOMs had been resolved. Thus, prior to the 2009 Annual ANEPM Compliance Report, all $PM_{2.5}$ TEOM data were reported with the US EPA internal PM_{10} adjustment factors included.

Recent work with collocated Federal Reference Method (batch lo-vol samplers) and continuous TEOM $PM_{2.5}$ instruments under the National $PM_{2.5}$ Equivalency Project has suggested that the unadjusted continuous TEOM $PM_{2.5}$ data closely approximates the $PM_{2.5}$ FRM data. This suggests that the application of the internal PM_{10} FEM adjustment factors is not required for TEOM $PM_{2.5}$ data.

However, until the findings of the national $PM_{2.5}$ Equivalence Project are analysed and reported, NSW will report both sets of data with and without the PM_{10} FEM internal adjustment factors.

This appendix therefore presents the $PM_{2.5}$ 24hr averaged TEOM data with the US EPA internal PM_{10} adjustment factors applied. These factors are A = 3 and B = 1.03 where y = A + Bx. The $PM_{2.5}$ 24hr averaged data presented in the main body of the report has factors of A = 0 and B = 1 applied. This additional data is included as a comparison and to highlight the affect of including the PM_{10} equivalency factors to the $PM_{2.5}$ data.

Section B

Particles as $PM_{2.5}$

Table A1: Summary of $PM_{2.5}$ concentrations in NSW (2010) – continuous TEOM method

Advisory Reporting Standard
25 µg/m^3 (24-hour average)
8 µg/m^3 (Annual average)

Region/ Performance monitoring station	Data availability rates (% of hours) Q1	Q2	Q3	Q4	Annual	Days above ARS	Annual mean (µg/m^3)
Sydney							
Chullora	80.0	94.5	98.9	100.0	93.4	1	**8.9**
Earlwood	95.7	91.3	97.0	95.6	94.9	1	**8.8**
Liverpool	92.3	96.9	94.2	95.4	94.7	1	**9.5**
Richmond	97.8	93.4	97.8	98.9	97.0	0	7.3
Illawarra							
Wollongong	92.8	95.8	84.9	95.2	92.1	1	**8.2**
Lower Hunter							
Beresfield	93.0	97.0	96.6	95.9	95.7	1	**9.1**
Wallsend	81.8	96.5	97.5	95.6	92.9	0	7.7

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Section C

Particles as $PM_{2.5}$

Table A2: Summary for $PM_{2.5}$ – Maximum 24-hour average concentrations (2010) – continuous TEOM method

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Chullora	93.4	341	**27.9**	27/03/2010	24.5	27/11/2010
Earlwood	95.9	350	**26.2**	27/03/2010	18.9	24/03/2010
Liverpool	95.9	350	**25.5**	27/03/2010	19.5	28/04/2010
Richmond	97.0	354	24.4	27/03/2010	18.9	17/05/2010
Illawarra						
Wollongong	92.9	339	**27.2**	27/03/2010	18.2	21/03/2010
lower Hunter						
Beresfield	97.3	355	**29.7**	27/03/2010	17.6	10/01/2010
Wallsend	92.9	339	22.4	27/03/2010	14.1	24/03/2010

AAQ NEPM advisory reporting standard – 25 µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Section D

Particles as $PM_{2.5}$

Statistical summary

Table A3: Statistical summary for $PM_{2.5}$ - Daily 24-hour average concentrations (2010) – continuous TEOM method

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (µg/m^3)	Percentiles (µg/m^3)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Chullora	93.4	**27.9**	21.2	18.6	15.3	13.2	10.5	8.2	6.5
Earlwood	95.9	**26.2**	20.0	17.6	14.8	13.0	10.5	8.1	6.5
Liverpool	95.9	**25.5**	21.3	19.0	16.6	14.2	11.3	8.7	6.9
Richmond	97.0	24.4	17.1	15.6	12.5	11.1	8.9	6.6	5.2
Illawarra									
Wollongong	92.9	**27.2**	18.5	17.2	14.3	12.5	9.5	7.3	6.1
lower Hunter									
Beresfield	97.3	**29.7**	18.6	16.7	15.0	13.2	10.7	8.5	7.1
Wallsend	92.9	22.4	15.3	14.0	12.1	10.6	8.9	7.3	6.1

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Trend data

Annual averages and annual maximum 24-hour averages for all stations are given below.

Table A4: Maximum 24-hour average concentrations for $PM_{2.5}$ (µg/m^3) – continuous TEOM method

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Chullora			**86.6**	**27.2**	**29.2**	**36.8**	24.1	23.1	**191.7**	**27.9**
Earlwood	**81.7**	**55.0**	**39.4**	23.7	**30.6**	**32.9**	23.4	21.8	**195.3**	**26.2**
Liverpool	**118.6**	**84.1**	**50.3**	**43.1**	**34.7**	**52.5**	**26.7**	**36.1**	**279.2**	**25.5**
Richmond	**101.4**	**101.3**	**61.9**	**27.0**	**26.4**	**35.5**	24.7	21.2	201.1	24.4
Illawarra										
Warrawong	23.4	**89.0**	**160.2**	**27.3**	**27.7**	18.4				
Wollongong	**51.1**	**91.8**	**112.2**	**26.3**	**25.7**	**30.4**	**26.2**	18.1	**251.2**	**27.2**
lower Hunter										
Beresfield	**67.4**	**51.4**	**47.1**	**31.6**	23.1	**28.6**	**26.7**	20.4	**240.8**	**29.7**
Wallsend	**56.3**	**60.3**	**34.1**	**27.2**	21.5	**29.4**	21.7	**26.4**	**431.1**	22.4

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

$PM_{2.5}$ 24 hour average

NEPM Annual Compliance reports prior to 2009 included 24 hour daily average calculations for $PM_{2.5}$ using hours 0 to 23. Daily averages are now calculated using hours 1 to 24 as detailed in the NEPM Technical Paper No. 5, "Data Collection and Handling". Accordingly, in the following tables, Table B4, B6, B7 and B9 to B14, the calculation of the 24 hour daily averages for 2009, differs in comparison to previous years.

Table A5: Annual average concentrations for $PM_{2.5}$ (µg/m^3) - continuous TEOM method

Region/ Performance monitoring Station	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sydney										
Chullora			**14.3**	**11.9**	**10.8**	**10.4**	**9.6**	**9.1**	**10.3**	**8.9**
Earlwood	**11.6**	**12.8**	**11.0**	**10.8**	**10.3**	**10.1**	**9.1**	**8.6**	**10.0**	**8.8**
Liverpool	**11.8**	**15.2**	**13.6**	**12.5**	**11.6**	**12.1**	**10.4**	**9.6**	**11.4**	**9.5**
Richmond	**10.3**	**12.3**	**10.0**	**9.6**	**9.0**	**9.1**	**9.6**	**10.5**	**9.0**	7.3
Illawarra										
Warrawong	**9.8**	**12.7**	**12.0**	**11.3**	**10.6**	**9.2**				
Wollongong	**9.3**	**11.6**	**10.5**	**9.8**	**9.5**	**9.5**	**9.1**	**8.4**	**10.2**	**8.2**
lower Hunter										
Beresfield	**12.4**	**13.7**	**9.3**	**10.9**	**10.0**	**10.0**	**9.5**	**9.1**	**11.7**	**9.1**
Wallsend	**10.1**	**11.3**	**9.8**	**9.9**	**9.7**	**9.6**	**9.0**	**9.0**	**11.2**	7.7

AAQ NEPM advisory reporting standard - 8µg/m^3 (annual average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Table A6: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Chullora

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2003	70.4	9	**86.6**	**40.6**	**29.1**	22.8	20.3	16.5	13.0	10.8
2004	89.6	2	**27.2**	23.6	22.1	19.4	17.4	14.2	11.1	8.9
2005	93.2	3	**29.2**	23.1	20.7	18.6	16.3	12.5	9.9	8.2
2006	94.2	2	**36.8**	20.1	18.0	16.5	14.7	12.1	9.6	7.9
2007	65.5	0	24.1	20.9	20.3	16.8	15.3	11.3	8.6	6.8
2008	96.7	0	23.1	20.1	17.8	15.2	13.2	10.8	8.6	6.8
2009	98.6	3	**191.2**	22.5	20.7	17.4	14.4	11.8	9.1	7.0
2010	93.4	1	**27.9**	21.2	18.6	15.3	13.2	10.5	8.2	6.5

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Table A7: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Earlwood

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	93.4	7	**81.7**	**53.2**	**25.8**	20.9	18.4	13.1	9.8	7.5
2002	98.9	15	**55.0**	**51.5**	**32.5**	23.5	20.8	15.1	11.0	8.0
2003	98.6	9	**39.4**	**34.3**	**27.9**	19.8	17.7	13.0	9.7	7.6
2004	96.2	0	23.7	23.1	21.5	18.6	16.5	13.4	10.0	7.6
2005	98.9	2	**30.6**	23.7	22.3	17.4	15.6	12.4	9.3	7.5
2006	98.6	3	**32.9**	21.3	18.6	16.5	14.9	11.6	9.6	7.5
2007	96.7	0	23.4	20.3	19.1	15.6	13.8	11.0	8.4	6.4
2008	98.6	0	21.8	18.8	18.1	14.6	12.9	10.4	8.0	6.3
2009	75.6	3	**195.3**	**26.2**	22.5	17.3	14.6	11.4	8.4	6.5
2010	95.9	1	**26.2**	20.0	17.6	14.8	13.0	10.5	8.1	6.5

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Table A8: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Liverpool

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	97.8	6	**118.6**	**57.0**	23.4	19.7	17.2	13.3	10.2	7.7
2002	96.7	38	**84.1**	**51.2**	**39.1**	**29.7**	25.9	18.0	12.9	9.5
2003	65.8	11	**50.3**	**47.2**	**33.3**	24.3	20.7	16.8	12.1	9.5
2004	85.5	9	**43.1**	**31.1**	**27.0**	20.7	19.3	15.2	11.8	8.3
2005	91.2	7	**34.7**	**27.9**	**25.7**	20.7	18.8	14.2	10.5	8.0
2006	98.6	3	**52.5**	**25.9**	22.1	19.3	17.5	14.3	11.5	9.1
2007	94.8	2	**26.7**	23.0	21.8	18.7	15.5	12.5	9.8	7.4
2008	92.6	1	**36.1**	20.1	18.3	15.6	13.9	11.6	9.0	7.0
2009	95.1	5	**279.2**	**29.0**	23.5	18.4	16.3	13.0	9.9	7.3
2010	95.9	1	**25.5**	21.3	19.0	16.6	14.2	11.3	8.7	6.9

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Table A9: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Richmond

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	58.9	3	**101.4**	**69.4**	22.0	16.8	14.2	10.8	8.8	6.5
2002	64.4	13	**101.3**	**60.7**	**45.8**	**25.8**	18.6	13.6	10.0	6.9
2003	95.9	10	**61.9**	**44.1**	**28.2**	19.2	15.1	11.0	8.4	6.5
2004	96.7	2	**27.0**	23.7	21.2	17.6	14.8	11.8	8.9	6.5
2005	83.8	1	**26.4**	19.2	17.9	15.8	14.1	10.5	8.0	6.4
2006	84.9	2	**35.5**	20.9	16.5	14.2	12.6	10.6	8.5	6.9
2007	12.9	0	24.7	22.2	19.5	17.0	12.8	10.9	9.2	7.4
2008	98.9	0	21.2	18.0	17.1	15.7	13.8	11.9	10.1	8.8
2009	89.3	4	**201.1**	**26.7**	20.4	14.8	13.1	9.9	7.5	5.9
2010	97.0	0	24.4	17.1	15.6	12.5	11.1	8.9	6.6	5.2

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Table A10: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Warrawong

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2000	97.3	3	**34.7**	21.4	19.3	15.5	13.2	10.5	8.3	6.7
2001	95.1	0	23.4	21.6	20.7	17.9	15.1	12.1	8.9	6.7
2002	96.7	18	**89.0**	**46.7**	**34.2**	**25.3**	20.9	15.3	10.6	8.0
2003	98.4	7	**160.2**	**29.8**	25.0	21.2	17.8	14.2	10.7	8.1
2004	94.5	3	**27.3**	24.6	22.2	20.5	17.8	14.1	10.4	7.9
2005	94.5	3	**27.7**	24.6	22.3	19.2	16.6	13.0	9.7	7.4
2006	40.5	0	18.4	18.4	17.4	15.9	14.1	11.5	9.1	6.4

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Table A11: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Wollongong

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	96.2	2	**51.1**	21.3	19.6	17.4	14.7	10.9	8.1	6.3
2002	95.6	18	**91.8**	**50.8**	**29.9**	**25.6**	18.4	13.6	9.5	7.1
2003	97.0	7	**112.2**	**34.8**	24.4	18.7	16	11.9	9.2	7.3
2004	97.0	2	**26.3**	22.7	21.1	17.9	15.7	12.2	9.1	6.7
2005	97.8	1	**25.7**	21.5	20.1	16.4	15.3	11.4	8.7	6.9
2006	100.0	2	**30.4**	20.9	17.8	15.9	14.5	11.7	8.9	6.7
2007	98.4	1	**26.2**	22.1	19.8	17.1	14.1	10.9	8.4	6.3
2008	94.0	0	18.1	17.6	16.4	14	12.6	10.2	7.9	6.1
2009	96.2	4	**251.2**	**26.7**	22.9	18.4	15.4	11.5	8.8	6.5
2010	92.9	1	**27.2**	18.5	17.2	14.3	12.5	9.5	7.3	6.1

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Table A12: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Beresfield

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	68.8	8	**67.4**	**34.8**	**29.8**	21.6	18.9	15.2	11.1	8.2
2002	95.1	25	**51.4**	**47.1**	**40.4**	**29.9**	22.3	15.8	11.4	8.7
2003	90.7	5	**47.1**	**30.5**	23.4	17.7	14.0	10.9	8.3	6.2
2004	90.4	1	**31.6**	23.9	23.2	20.0	16.7	13.1	10.3	7.7
2005	93.7	0	23.1	21.3	19.8	18.3	15.6	12.1	9.1	7.2
2006	98.9	3	**28.6**	21.3	19.0	16.7	14.7	11.8	9.1	7.4
2007	86.0	1	**26.7**	20.7	19.4	17.0	14.8	11.7	8.7	6.6
2008	92.1	0	20.4	18.6	17.3	15.1	13.0	10.9	8.9	6.7
2009	94.0	8	**240.8**	**38.4**	**25.1**	19.8	17.0	12.9	9.8	7.8
2010	97.3	1	**29.7**	18.6	16.7	15.0	13.2	10.7	8.5	7.1

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03

Table A13: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations – continuous TEOM method

Station: Wallsend

Year	Data availability rates (%)	Days above advisory reporting standard	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	94.8	7	**56.3**	**34.2**	**26.0**	18.0	15.6	11.6	8.6	7.0
2002	85.5	13	**60.3**	**44.7**	**33.3**	23.1	17.6	12.8	9.3	7.3
2003	88.2	4	**34.1**	**26.6**	22.1	16.8	14.4	12.0	8.7	6.9
2004	87.4	1	**27.2**	20.9	18.7	16.2	14.3	11.8	9.0	7.3
2005	95.9	0	21.5	20.0	18.8	16.7	14.6	11.6	9.0	7.2
2006	99.2	2	**29.4**	20.1	17.9	15.5	13.8	11.4	9.0	7.2
2007	92.3	0	21.7	18.7	18.3	15.7	13.3	10.7	8.3	6.4
2008	87.7	1	**26.4**	21.8	18.1	15.4	13.4	10.7	8.3	6.5
2009	90.7	5	**431.1**	**42.6**	23.9	17.7	15.9	11.3	8.6	6.9
2010	92.9	0	22.4	15.3	14.0	12.1	10.6	8.9	7.3	6.1

AAQ NEPM advisory reporting standard - 25µg/m^3 (24-hour average)

Bold font indicates values in excess of the AAQ NEPM advisory reporting standard

* Please note that all $PM_{2.5}$ TEOM data uses USEPA factors of A=3 and B=1.03