NATIONAL ENVIRONMENT PROTECTION (AMBIENT AIR QUALITY) MEASURE

NEW SOUTH WALES ANNUAL COMPLIANCE REPORT 2004

(Prepared June 2005)

Department of
Environment and Conservation (NSW)

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Contents

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
CO	Carbon monoxide
DEC	Department of Environment and Conservation (NSW)
EPA	Environment Protection Authority
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
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
SO_2	Sulfur dioxide
$\mu g/m^3$	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

Introduction

The goal of the National Environment Protection Measure for Ambient Air Quality (AAQ NEPM) is to meet the NEPM standards (within the maximum number of allowable exceedences) by 2008.

This report, required under Clause (18) of the Ambient Air Quality NEPM, demonstrates that in 2004 NSW has met the requirements of the Ambient Air Quality NEPM for most pollutants. Non-compliance has been demonstrated for ozone in Sydney, and the Illawarra region, and for particles as PM_{10} at Wagga Wagga.

In 1998, the Government released Action for Air, its comprehensive long-term plan to protect and improve regional air quality in the Sydney Greater Metropolitan Region (GMR). The plan tackles regional air quality issues such as particle pollution and photochemical smog (ozone). The NSW air quality management plan, *Action for Air*, outlines a broad range of strategies used to manage air quality in NSW such as integrating air quality goals and urban transport planning; providing more and better transport choices; making cars, trucks and buses cleaner; promoting cleaner homes and business; and managing the impact of open burning. Action for Air is a 25-year plan that is reviewed regularly to assess achievements and the need for adaptation of control strategies. Action for Air is currently under review, following on from a stakeholder consultation Clean Air Forum held in November 2004.

Meeting the Ambient Air Quality NEPM goal for ozone will be a challenge for the major urban areas of NSW given pressures from a growing population, urban expansion and associated increase in motor vehicle use. However, NSW has a broad range of strategies to reduce precursor pollutants in place, and being developed, under Action for Air. These include the requirement for Stage 1 vapour controls at service stations in Sydney, the NSW Cleaner Vehicles Action Plan as well as initiatives under the Cleaner Industries Program and the Clean Air Fund. The latter two focus on reducing precursor emissions from smaller, commercial/industrial sources and, in the case of the Clean Air Fund, also domestic sources. A regulatory framework, which restricts emissions from larger industry through license limits and load-based fees, is in place. These measures, together with stricter motor vehicle emission standards, tighter fuel regulations, including the introduction of regulated limits on summer petrol volatility in Sydney, and NSW Diesel NEPM programs will help move NSW towards meeting the NEPM goal for ozone in the longer term.

Over and above the impacts of drought, bushfires and dust storms, meeting the goal of the Ambient Air Quality NEPM for particles, measured as PM_{10}, presents a challenge for NSW. This is particularly the case in rural population centres where a combination of topography, climate and relatively high use of solid fuel heaters, combine to produce elevated levels of particles in winter. Similarly, bringing $PM_{2.5}$ levels in line with the $PM_{2.5}$ advisory reporting standards is an area of difficulty for NSW with all $PM_{2.5}$ reporting stations exceeding the annual average reporting standard during 2004.

As is the case for ozone, Action for Air includes a broad range of strategies for managing particle emissions (both PM_{10} and $PM_{2.5}$) across mobile, industry and domestic sources. Some of the more significant initiatives are:

- National vehicle emission and fuel quality standards;
- Actions under the Diesel National Environment Protection Measure which requires jurisdictions to assess the impact of emissions from in service diesel vehicles and where necessary to implement programs to reduce them. NSW programs include the Smoky Vehicle Enforcement program;
- Particle emissions limits for industrial combustion processes under the Clean Air Plant and Equipment Regulation (currently in the process of renewal);
- Environmental Impact Assessment processes for new developments;
- Emission limits for particles from solid fuel heaters; and
- the Woodsmoke Reduction Program that was run from 2002 to 2004 to reduce woodsmoke from solid fuel heaters in regional areas.

Formation of the DEC

In September 2003 the NSW Environment Protection Authority (EPA) was brought together with the National Parks and Wildlife Service (NPWS), Resource NSW, and the Botanic Gardens and Domain Trust to form the NSW Department of Environment and Conservation (DEC). The former Environment Protection Authority's air program has been incorporated into the new department.

Monitoring summary

NSW Air Quality Monitoring Plan (AQMP)

Under the Ambient Air Quality NEPM, jurisdictions were required to prepare a Monitoring Plan to meet the monitoring requirements detailed in the Ambient Air Quality NEPM. The approved NSW Ambient Air Quality NEPM monitoring plan outlines the monitoring network for each of the required pollutants and is available on the Department of Environment and Conservation website www.dec.nsw.gov.au/air/nepm/index.htm

The NSW Ambient Air Quality NEPM Monitoring Plan was approved as consistent with the Ambient Air Quality NEPM by NEPC on 29 June 2001. Twenty-seven monitoring stations are nominated in the plan, being a mixture of permanent and campaign stations. Twenty-two stations were operational during 2004. The remaining five stations are proposed to be established according to a staged schedule.

The Sydney region

The population of the Sydney region requires at least seven monitoring stations according to the formula in clause 14(1) of the Ambient Air Quality NEPM. Monitoring stations have been selected for the region to ensure that there is adequate coverage of the population, and that the network will capture the higher concentrations.

The NSW Ambient Air Quality NEPM Monitoring Plan provides for monitoring in the Sydney region to be undertaken at seven trend stations, three performance stations, and two campaign stations. Two trend stations have been selected from each sub-region with an additional trend station on the coast to represent the particular conditions there. These will 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 the region. The choice of stations in each region was made to optimise both population coverage and representation of the occurrences of higher pollutant concentration.

Trend stations are located in the northwest at Blacktown and Richmond, in the southwest at Bringelly and Macarthur, and in the east at Chullora, Rozelle and Wooloowware. These seven trend stations provide a good geographic spread throughout the region and capture a range of the high concentration events. The CBD station is a peak station as defined in AS 2922-1987 rather than a neighbourhood station and is designed to capture the impact of motor vehicle emissions (carbon monoxide and lead). To supplement the trend monitoring network additional stations are needed to capture particular events. High concentrations of ozone are frequently recorded at Oakdale. This station is on the edge of the Sydney basin in a sparsely populated area, however ozone concentrations in this region are an important measure of progress to achieving the goal of the Ambient Air Quality NEPM.

Air Quality NEPM screening guidelines allow for carbon monoxide and lead to be monitored at fewer stations. For carbon monoxide four trend stations and the peak CBD station are nominated as NEPM stations; for lead the Rozelle trend station and the CBD peak station are nominated stations.

Campaign monitoring will be undertaken in the Central Coast, in the northern part of the Sydney region. The outcome of this monitoring will determine whether there is a need to establish a trend station in this area. Installation of this monitoring station has been delayed and is not expected until late 2005 at the earliest.

The trend station at Lidcombe was closed due to construction activity in May 2002. A new station was established nearby at Chullora in December 2002. Trend data are reported for both stations.

The new Macarthur station was established in November 2004 and will replace the Liverpool station as an Ambient Air Quality NEPM station.

The monitoring network for the Sydney region is shown in Figure 1 and summarised in Table 1, which lists all stations noting the parameters measured at each.

Table 1: Sydney region Ambient Air Quality NEPM monitoring network

Station	Station type [1]	Number of parameters	Ozone	Nitrogen dioxide	PM_{10}	Carbon monoxide	Sulfur dioxide	Lead
Blacktown	T	5	X	X	X	X	X	
Bringelly	T	4	X	X	X		X	
Central Coast [2]	C	4	X	X	X		X	
Chullora [3]	T	5	X	X	X	X	X [6]	
Liverpool [4]	C	5	X	X	X	X		
Macarthur	T	5	X	X	X	X [6]	X [6]	
Oakdale	P	2	X		X			
Richmond	T	4	X	X	X		X	
Rozelle	T	5	X	X	X	X		X
St Marys	P	1	X					
Woolooware	T	4	X	X	X		X	
CBD [5]	P	2				X		X

(1) P denotes performance; T denotes trend; C denotes campaign.
(2) Scheduled to begin operation in 2005.
(3) Replaced the Lidcombe trend station.
(4) Data from the Liverpool station will be reported at least until the Macarthur station is fully established.
(5) Peak station.
(6) Instrument to be installed in 2005.

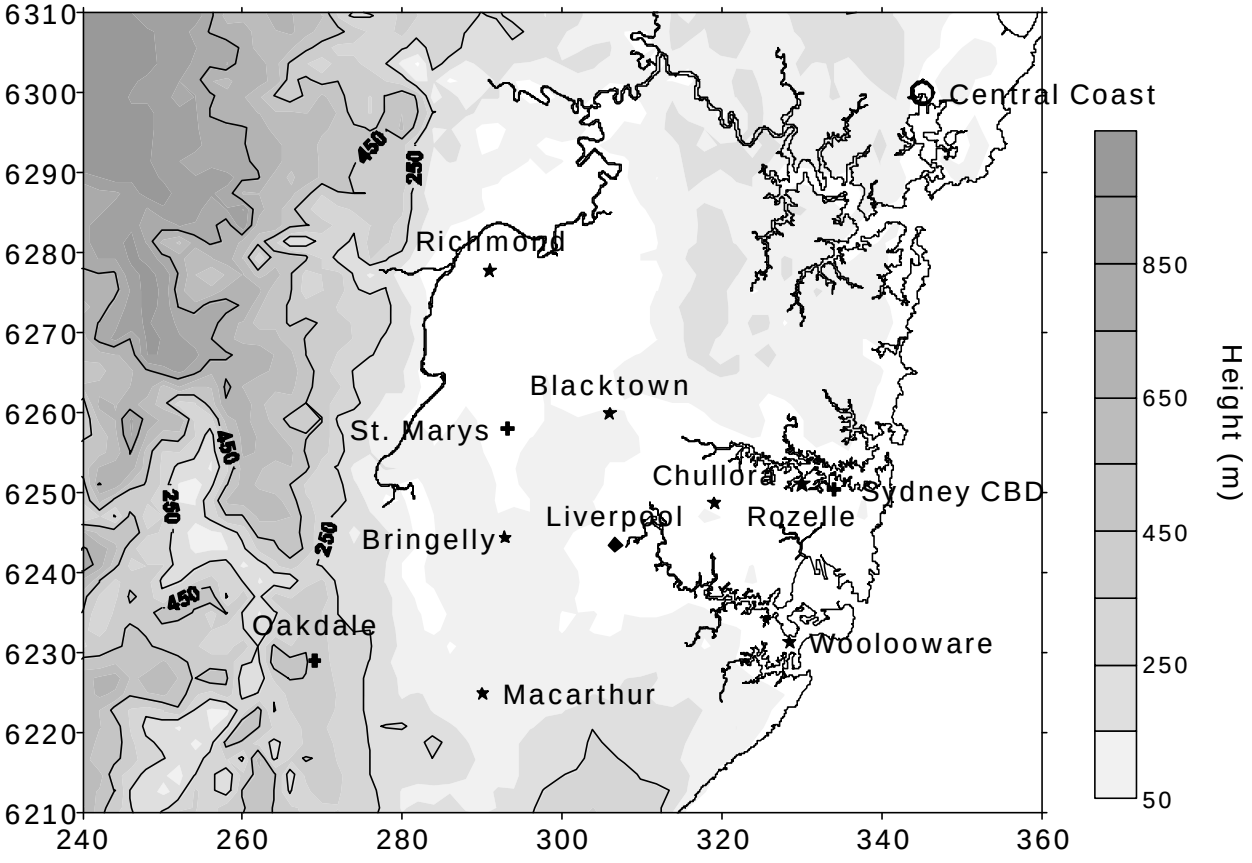

Figure 1: Ambient Air Quality NEPM Monitoring in the Sydney region (AMG co-ordinates)

★ trend station; + performance station; ◆ campaign station; ○ proposed station;

The Lower Hunter region

The population criterion of section 14(2) of the Ambient Air Quality NEPM requires at least two monitoring sites in the Lower Hunter region. The region contains two major population centres, Newcastle and Maitland. Current monitoring has focussed on Newcastle and its environs. The installation of the planned trend station in the Maitland area has been delayed. Until this site is established, data from the existing stations at Wallsend and Beresfield will be reported. Together these stations characterise the general air quality to which the urban population of the Lower Hunter is exposed.

The monitoring network for the Lower Hunter is shown in Figure 2 and summarised in Table 2, which notes the parameters to be reported from each station.

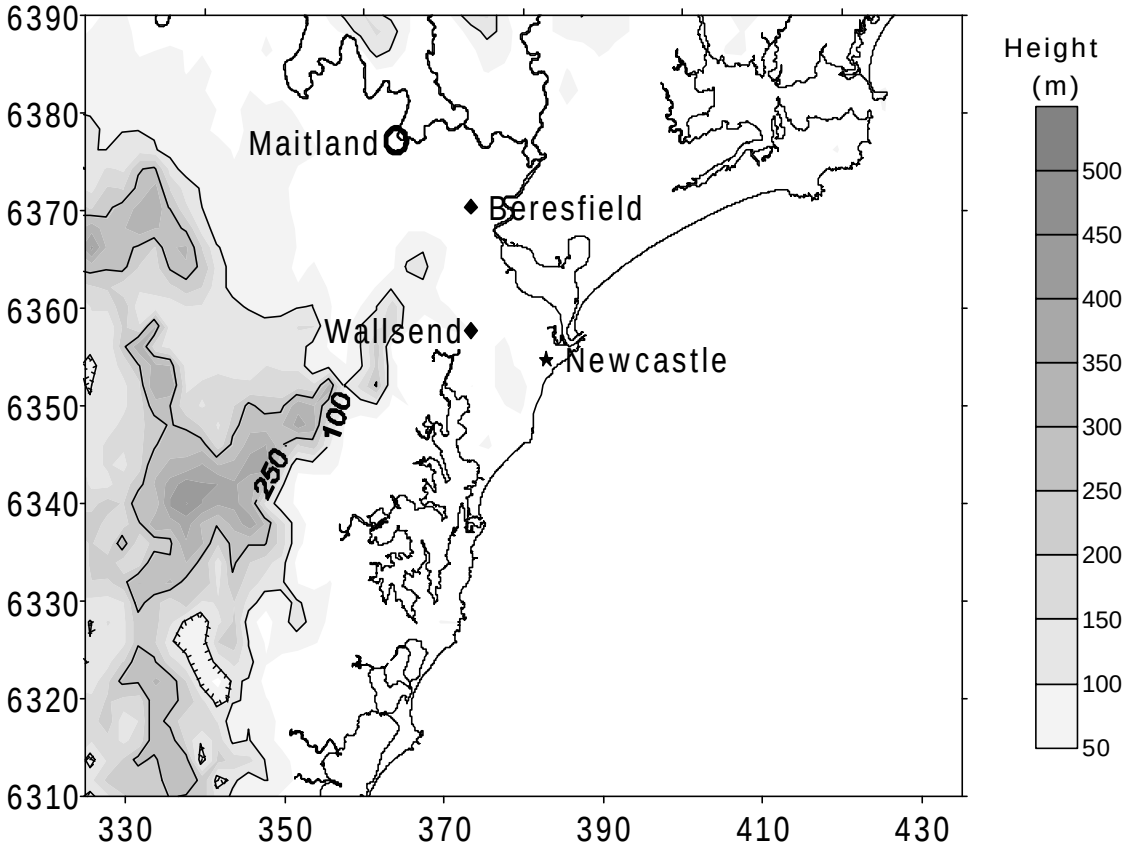

Figure 2: Ambient Air Quality NEPM Monitoring in the Lower Hunter region (AMG co-ordinates)

★ trend station; ◆ campaign station; ○ proposed station;

Table 2: Lower Hunter region Ambient Air Quality NEPM monitoring network

Station	Station Type [1]	Number of parameters	Ozone	Nitrogen dioxide	PM_{10}	Carbon monoxide	Sulfur dioxide	Lead
Newcastle	T	5	X	X	X	X	X [4]	
Maitland [2]	T	5	X	X	X		X	X (C)
Beresfield [3]	C	1			X			
Wallsend [3]	C	4	X	X			X	X (C)

(1) P denotes performance; T denotes trend, C denotes campaign.
(2) Scheduled to begin operation in 2004, but delayed.
(3) Data from Beresfield and Wallsend will be reported at least until the Maitland station is established.
(4) Instrument to be installed in 2005.

The Illawarra region

In the Illawarra, the presence of industrial sources in the region, the occurrence of emissions transport from Sydney, and the complexity of the region together result in a need for a greater monitoring effort than that indicated purely on the basis of population. Accordingly, the general air quality to which the urban population is exposed will be characterised by monitoring all pollutants of interest at the trend station at Wollongong and the performance station at Albion Park. Two additional stations represent the local conditions at Kembla Grange and Warrawong.

Ambient Air Quality NEPM screening guidelines allow for carbon monoxide to be monitored at fewer stations. Carbon monoxide is monitored only at the Wollongong trend station.

The monitoring network for the Illawarra Region is shown in Figure 3 and summarised in Table 3, which notes the parameters to be reported from each station.

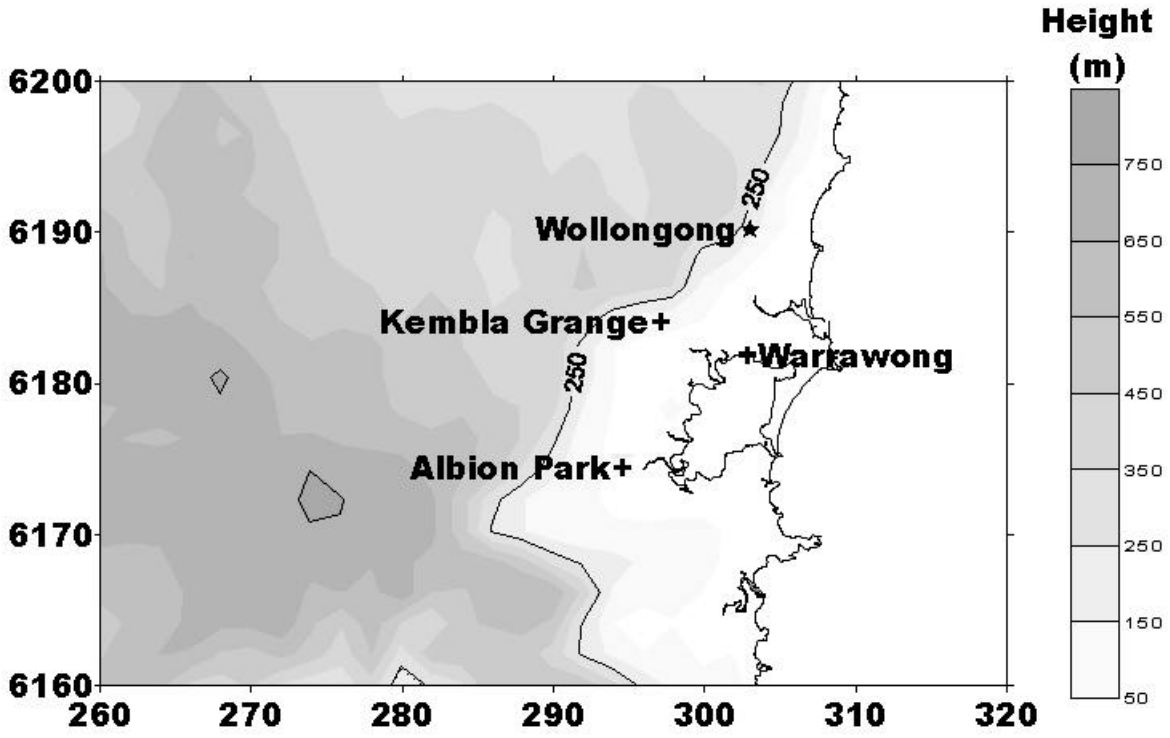

Figure 3: Ambient Air Quality NEPM Monitoring in the Illawarra region (AMG co-ordinates)

★ trend station; + performance station;

Table 3: Illawarra region Ambient Air Quality NEPM monitoring network

Station	Station type (1)	Number of parameters	Ozone	Nitrogen dioxide	PM_{10}	Carbon monoxide	Sulfur dioxide	Lead
Albion Park	P	4	X	X	X		X	
Kembla Grange	P	2	X		X			
Warrawong	P	2					X	X(C)
Wollongong	T	5	X	X	X	X	X	

(1) P denotes performance; T denotes trend; C denotes campaign.

Other regions

The NSW Ambient Air Quality NEPM Monitoring Plan provides for monitoring at several regional centres of NSW. Ambient Air Quality NEPM screening guidelines allow for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide and lead not to be monitored at these rural population centres.

Several regional centres are located on the tablelands where smoke from wood fires may be of concern during winter. As there is the potential for exceedences of the Ambient Air Quality NEPM goal for particles, the Department of Environment and Conservation (DEC) has begun campaign monitoring at Albury, Bathurst, Tamworth and Wagga Wagga. On completion of these campaigns the data will be evaluated against the screening procedures. A decision will be made whether it is necessary to establish further campaign stations at Dubbo, Lismore, and Orange as originally proposed.

Table 4: Rural NSW Ambient Air Quality NEPM monitoring network

Station	Station type (1)	Number of parameters	Ozone	Nitrogen dioxide	PM_{10}	Carbon monoxide	Sulfur dioxide	Lead
Albury	C	1			X			
Bathurst	C	2	X		X			
Dubbo (2)	C	1			X			
Lismore (2)	C	1			X			
Orange (2)	C	1			X			
Tamworth	C	1			X			
Wagga Wagga	C	1			X			

(1) C denotes campaign.
(2) Monitoring subject to results from initial campaign monitoring.

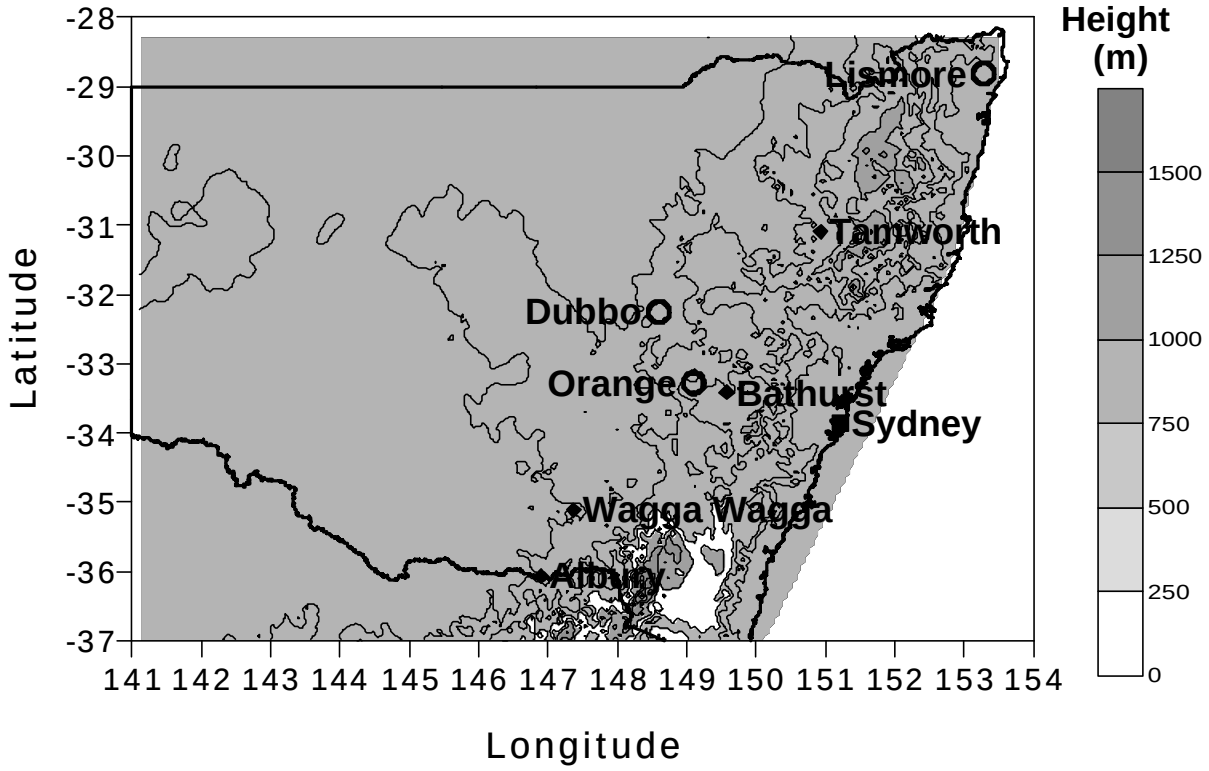

Figure 4: Ambient Air Quality NEPM Monitoring in rural New South Wales

◆ campaign station; ○ proposed station;

Population exposure

Under the NSW Ambient Air Quality NEPM Monitoring Plan, monitoring stations have been distributed to provide a reasonable coverage of the population while capturing the spatial variability of pollution events. The monitoring network covers a population of about 4 million in the greater metropolitan area of the Sydney, lower Hunter and Illawarra regions. The current monitoring in regional NSW covers an additional population of about 140 000. Information about the characteristics of individual monitoring stations and exposed population is given in the NSW Monitoring Plan, available on the DEC website http://www.dec.nsw.gov.au/air/nepm/index.htm

Table 5: Population exposure

Station	Exposed population
Sydney Region	
Blacktown	Trend station in a largely residential area in the northwest sub-region.
Bringelly	Trend station in a rural area in the southwest of the Sydney basin.
Chullora	Trend station in a mixed residential and commercial area. Replaced the Lidcombe trend station, which had operated since 1970.
Macarthur	Trend station representing residential areas in the southwest of the Sydney basin.
Oakdale	Rural area on the SW edge of the Sydney basin - upper bound station for ozone.
Richmond	Trend station representing the residential area in the north of the Hawkesbury basin.
Rozelle	Trend station within the Parramatta River valley. Existing long-term station.
St Marys	Upper bound station for ozone in a residential area.
Sydney CBD	Upper bound station for CO and Pb in the central business district. This is a peak station adjacent to a heavily trafficked road in an urban canyon.
Woolooware	Trend station in a residential area on the south of Botany Bay and within five kilometres of a major industrial complex. Represents coastal conditions south of the CBD, reporting peak levels when precursors are trapped within coastal circulations.
Central Coast (1)	Trend station representing residential areas of the Central Coast.
Lower Hunter	
Beresfield	Performance station in a semi-rural area used as a proxy for the Maitland station.
Maitland (2)	Trend station representing residential area.
Newcastle	Trend station within the main population centre.
Wallsend	Performance station in a residential area used as a proxy for the yet-to-be-established Maitland station.
Illawarra	
Albion Park	Performance station in a semi-rural area in the south of the region.
Kembla Grange	Upper bound station in a residential area to the west of Lake Illawarra.
Warrawong	Upper bound station in an industrial-residential area.
Wollongong	Trend station in the main population/commercial centre.
Rural Population centres	
Tamworth	Rural township campaign station established 2000.
Bathurst	Rural township campaign station established 2000.
Wagga Wagga	Rural township campaign station established 2001.
Albury	Rural township campaign station established 2000.
Dubbo (3)	Rural township campaign station.
Orange (3)	Rural township campaign station.
Lismore (3)	Rural township campaign station.

(1) Station to be established.

(2) Station to be established. Data reported from Beresfield and Wallsend in the interim.

(3) Future campaign stations are subject to evaluation of initial campaign monitoring.

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 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 DEC website http://www.dec.nsw.gov.au/air/nepm/index.htm

NATA accreditation

As required under Clause 12 of the Ambient Air Quality NEPM, the DEC 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 was undertaken by NATA in May 2004. The DEC's accreditation has been continued.

Monitoring methods

The NSW network is comprised of instruments that are in accordance with the relevant Australian standard. 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.

Table 6: 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)

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 Blacktown, CBD, Liverpool, Rozelle, Woolooware, Warrawong, Tamworth, and Wagga Wagga.

Table 7: Stations not complying with all siting and exposure criteria

Station	Siting criteria not met	Comments
Blacktown	Less than 20m from trees.	Best site in very limited area on Blacktown ridge
CBD	Clear sky angle <120°, restricted airflow.	Attributes typical of peak site in CBD.
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.
Woolooware	Clear sky angle <120°. Less than 20m from trees.	Trees have grown since establishment of station.
Warrawong	Less than 20m from trees.	Best location in urban area specifically targeted for monitoring.
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

Data availability

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 DEC undertakes daily an 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.

New sites and site closures

A new monitoring station situated at the University of Western Sydney - Macarthur, was opened in November 2004. This station is nominated as a trend station in the NSW Air Quality Monitoring Plan and together with Bringelly, is designed to monitor general air quality in the southwest of Sydney. Currently NO_x, O_3 and PM_{10} are measured at Macarthur. SO_2 and CO monitors will also be installed.

The Blacktown monitoring station was closed in June 2004 as the land where the station was located was sold for residential development. The location of this monitoring station, directly on the Blacktown Ridge provided valuable data that contributed to a better understanding of air movements between the Hawkesbury basin and the Parramatta River valley. The Department of Environment and Conservation is currently in the process of locating a site suitable for re-establishing monitoring in the Blacktown Ridge area.

The Woolooware and Sydney CBD monitoring stations were decommissioned in late August 2004.

Data loss

Not including station establishment and closures listed above, no significant amounts of data were lost during 2004. PM_{10} monitors were installed at Kembla Grange, Oakdale and Newcastle during the year, thus data availability rates from these stations do not meet the Ambient Air Quality NEPM goal.

Some instrument failures led to data availability rates lower than the Ambient Air Quality NEPM goal. These included the CO monitor at Chullora, and the PM_{10} monitors at Beresfield, Albury and Tamworth.

Assessment of compliance with standards and goal

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

A station is assessed as complying with the Ambient Air Quality NEPM standard if less than the allowed number of exceedences are recorded at the station, and data availability is greater than seventy-five percent both for the year, and for each quarter of the year. A station can demonstrate non-compliance if a greater number of days than allowed exceed the relevant standard, even if that station does not comply with data availability rates. If a station records no exceedences, or exceedences on a number of days less than that allowed, but has not complied with data availability rates, then the station is assessed as compliance not demonstrated.

A region demonstrates compliance when either all stations in the region demonstrate compliance, or when the region meets approved pollutant screening criteria.

Carbon monoxide

Table 8: 2004 compliance summary for CO in New South Wales

						AAQ NEPM Standard 9.0 ppm (8-hour average)	
Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Sydney							
Blacktown	97.4	67.2	00.0	00.0	40.9	0	ND (#)
CBD	99.6	98.0	60.4	00.0	64.3	0	ND (#)
Chullora	63.1	96.1	94.1	85.9	84.8	0	ND
Liverpool	96.6	98.2	96.6	97.7	97.3	0	Met
Macarthur (1)							
Rozelle	97.3	98.4	88.7	91.8	94.0	0	Met
Illawarra							
Wollongong	99.6	97.3	98.5	93.8	97.3	0	Met
Lower Hunter							
Newcastle	97.1	98.8	98.8	93.3	97.0	0	Met

ND Not demonstrated.

(1) Instrument to be installed. Data reported from Liverpool in the interim.

(#) Site newly commissioned or de-commissioned in 2004.

During 2004, the carbon monoxide standard was not exceeded anywhere within NSW where monitoring took place. Compliance with the Ambient Air Quality NEPM goal was demonstrated in the Illawarra and lower Hunter regions, and by screening in rural population centres. Compliance was not demonstrated in Sydney because the data availability criteria were not met at Chullora due to monitoring system failure, and at Blacktown and the CBD due to the closure of these stations.

Nitrogen dioxide

Table 9: 2004 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									
Blacktown	93.5	64.7	00.0	00.0	39.3	0	0.013	ND (#)	ND (#)
Bringelly	89.7	94.1	92.1	88.4	91.1	0	0.006	Met	Met
Chullora	80.8	92.0	80.3	84.1	84.3	0	0.016	Met	Met
Liverpool	93.8	94.4	92.8	93.8	93.7	0	0.013	Met	Met
Macarthur (1)									
Richmond	88.7	90.3	84.6	90.1	88.4	0	0.007	Met	Met
Rozelle	93.5	89.3	84.1	89.9	89.2	0	0.014	Met	Met
Woolooware	85.1	94.1	61.2	00.0	59.9	0	0.009	ND (#)	ND (#)
Central Coast (2)									
Illawarra									
Albion Park	95.0	91.8	85.6	93.2	91.4	0	0.004	Met	Met
Wollongong	90.9	92.5	94.4	91.1	92.2	0	0.009	Met	Met
Lower Hunter									
Newcastle	93.2	95.1	81.2	94.6	91.0	0	0.009	Met	Met
Maitland (3)									
Wallsend	88.9	93.8	91.9	94.0	92.2	0	0.008	Met	Met

ND Not demonstrated.

(1) Station established November 2004. Data reported from Liverpool until station fully operational.

(2) Station to be established.

(3) Station to be established. Data reported from Wallsend in the interim.

(#) Site newly commissioned or de-commissioned in 2004.

During 2004, the nitrogen dioxide 1-hour and annual standards were not exceeded anywhere within NSW where monitoring took place. Compliance with the Ambient Air Quality NEPM goal was demonstrated in the Illawarra and lower Hunter regions. Compliance was not demonstrated in Sydney because the data availability criteria were not met at Blacktown and Woolooware (due to the closure of these stations).

Ozone

Table 10: 2004 compliance summary for O_3 in New South Wales

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedences (days)		Performance against the standards and goal	
						AAQ NEPM standard 0.10 ppm (1-hour average) 0.08 ppm (4-hour average)			
	Q1	Q2	Q3	Q4	Annual	1-hour	4-hour	1-hour	4-hour
Sydney									
Blacktown	92.8	66.0	00.0	00.0	39.5	**2**	**4**	Not met	Not met
Bringelly	94.1	95.1	87.0	88.3	91.1	**6**	**7**	Not met	Not met
Chullora	84.7	88.5	91.8	84.1	87.2	1	**4**	Met	Not met
Liverpool	94.0	91.4	89.1	94.7	92.3	**3**	**5**	Not met	Not met
Macarthur (1)									
Oakdale	84.9	66.9	95.1	95.2	85.6	**7**	**7**	Not met	Not met
Richmond	83.9	90.9	93.1	90.1	89.5	0	1	Met	Met
Rozelle	90.4	93.6	81.6	90.0	88.9	0	1	Met	Met
St Marys	95.1	94.3	95.4	89.5	93.6	**3**	**4**	Not met	Not met
Woolooware	87.6	91.9	61.7	00.0	60.2	1	1	ND (#)	ND (#)
Central Coast (2)									
Illawarra									
Albion Park	94.9	92.0	94.6	92.7	93.5	1	1	Met	Met
Kembla Grange	88.8	92.1	92.1	92.3	91.3	**3**	**3**	Not met	Not met
Wollongong	92.0	91.8	94.6	91.6	92.5	1	**2**	Met	Not met
Lower Hunter									
Maitland (3)									
Newcastle	92.2	95.5	95.1	86.5	92.3	1	0	Met	Met
Wallsend	86.6	93.9	85.3	87.1	88.2	1	0	Met	Met
Regional									
Bathurst	95.7	80.9	94.8	88.3	89.9	0	0	Met	Met

ND Not demonstrated.

Bold font indicates values that exceed the AAQ NEPM standard

(1) Station established November 2004. Data reported from Liverpool until station fully operational.

(2) Station to be established

(3) Station to be established. Data reported from Wallsend in the interim.

(#) Site newly commissioned or de-commissioned in 2004.

Both the 1-hour and 4-hour standards for ozone were exceeded in NSW during 2004. Sydney and the Illawarra region did not comply with the Ambient Air Quality NEPM goal. Compliance was demonstrated in the lower Hunter and Bathurst.

Sulfur dioxide

Table 11: 2004 compliance summary for SO_2 in New South Wales

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of exceedences (days)		Annual Mean (ppm)	Performance against the standards and goal		
	Q1	Q2	Q3	Q4	Annual	1-hour	24-hour		1-hour	24-hour	1-year
									AAQ NEPM standards		
									0.20 ppm (1-hour average)		
									0.08 ppm (24-hour average)		
									0.02 ppm (1-year average)		
Sydney											
Blacktown	92.4	65.0	00.0	00.0	39.1	0	0	0.001	ND (#)	ND (#)	ND (#)
Bringelly	87.3	94.7	92.7	88.4	90.8	0	0	0.000	Met	Met	Met
Chullora (1)											
Macarthur (1)											
Richmond	88.9	88.7	92.5	88.8	89.7	0	0	0.000	Met	Met	Met
Woolooware	89.0	94.1	60.2	00.0	60.7	0	0	0.001	ND (#)	ND (#)	ND (#)
Central Coast (2)											
Illawarra											
Albion Park	94.0	91.8	93.5	92.3	92.9	0	0	0.001	Met	Met	Met
Warrawong	93.6	90.9	94.6	86.4	91.4	0	0	0.001	Met	Met	Met
Wollongong	94.2	91.4	94.4	91.0	92.8	0	0	0.001	Met	Met	Met
Lower Hunter											
Maitland (3)											
Newcastle (1)											
Wallsend	81.7	93.8	91.3	93.4	90.1	0	0	0.002	Met	Met	Met

ND Not demonstrated.

(1) Instrument to be installed in 2005.

(2) Station to be established.

(3) Station to be established. Data reported from Wallsend in the interim.

(#) Site newly commissioned or de-commissioned in 2004.

During 2004, the sulfur dioxide 1-hour, 24-hour and annual standards were not exceeded anywhere within NSW where monitoring took place. Compliance with the Ambient Air Quality NEPM goal was demonstrated in the Illawarra and lower Hunter regions, and through screening in rural population centres. Compliance was not demonstrated in Sydney because the data availability criteria were not met due to the closure of the Blacktown and Woolooware stations.

Particles as PM_{10}

Table 12: 2004 compliance summary for PM_{10} in New South Wales

Region/ Performance monitoring Station	Data availability rates (% of days)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
						AAQ NEPM Standard 50 µg/m³ (24-hour average)	
Sydney							
Blacktown	92.3	51.6	00.0	00.0	35.8	0	ND (#)
Bringelly	94.5	96.7	91.3	91.3	93.4	2	Met
Chullora	85.7	97.8	89.1	89.1	90.4	2	Met
Liverpool	100.0	92.3	87.0	88.0	91.8	1	Met
Macarthur (1)							
Oakdale (2)	00.0	27.5	98.9	98.9	56.6	0	ND (#)
Richmond	98.9	91.2	100.0	94.6	96.2	0	Met
Rozelle	92.3	95.6	93.5	89.1	92.6	1	Met
Woolooware	94.5	98.9	65.2	00.0	64.5	0	ND (#)
Central Coast (3)							
Illawarra							
Albion Park	95.6	98.9	96.7	92.4	95.9	1	Met
Kembla Grange (2)	00.0	30.8	97.8	100.0	57.4	1	ND (#)
Wollongong	98.9	97.8	93.5	98.9	97.3	0	Met
Lower Hunter							
Beresfield	96.7	94.5	87.0	70.7	87.2	1	ND
Maitland (4)							
Newcastle (2)	00.0	00.0	00.0	77.2	19.4	0	ND (#)
Regional							
Albury	29.7	84.6	95.7	96.7	76.8	2	ND
Bathurst	98.9	83.5	82.6	89.1	88.5	4	Met
Dubbo (3)							
Lismore (3)							
Orange (3)							
Tamworth	92.3	95.6	73.9	56.5	79.5	2	ND
Wagga Wagga	98.9	94.5	91.3	79.3	91.0	**28**	Not met

ND Not demonstrated. **Bold** font indicates values that exceed the AAQ NEPM standard

(1) Station established November 2004. Data reported from Liverpool until station fully operational.

(2) Instrument installed 2004.

(3) Station to be established

(4) Station to be established. Data reported from Beresfield in the interim. .

(#) Site newly commissioned or de-commissioned or newly installed instrumentation in 2004.

During 2004 the PM_{10} standard was exceeded in all regions where monitoring took place. Compliance was demonstrated at Bathurst. Compliance was not demonstrated at Albury and Tamworth, as the data availability criteria were not met. Similarly the data availability criteria were not met in the Sydney, Illawarra and lower Hunter regions. This was due to the closure of the Blacktown and

Woolooware stations and the new installation of PM_{10} monitors at the Oakdale, Kembla Grange and Newcastle monitoring stations. Wagga Wagga did not comply with the Ambient Air Quality NEPM with 28 days that exceeded the standard.

Lead

Table 13: 2004 compliance summary for Pb in New South Wales

Region/ Performance monitoring Station	Data availability rates (% of days)					AAQ NEPM Standard 0.50 µg/m^3 (1-year average)	
	Q1	Q2	Q3	Q4	Annual	Annual Mean (µg/m^3)	Performance against the standards and goal
Sydney							
CBD	93	67	69	0	57	<0.02 (2)	ND(#)
Rozelle	100	100	94	80	89	<0.01 (2)	Met(#)
Illawarra							
Warrawong	100	73	88	60	80	<0.02 (2)	ND(#)
Lower Hunter							
Wallsend Maitland (1)	100	93	63	0	64	<0.02 (2)	ND(#)

ND Not demonstrated.

(1) Station to be established. Data reported from Wallsend in the interim.

(2) Average calculated using some data below the minimum detection limit.

(#) Site de-commissioned during 2004.

Lead levels in New South Wales continue to be significantly below the Ambient Air Quality NEPM goal. For the previous three years the highest annual average recorded in New South Wales was 0.09µg/m^3 at Wallsend in 2003, only 18% of the standard. 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 using ICP-AES - Inductively Coupled Plasma-Atomic Emission Spectroscopy analysis (0.007µg/m^3).

During 2004 the Department of Environment and Conservation phased out ambient lead monitoring for the AAQ NEPM. Hence data availability rates are less than the Ambient Air Quality NEPM guidelines.

Analysis of air quality monitoring

The Ambient Air Quality NEPM states that short-term standards should not be exceeded on more than one day per year for carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide, and on no more than five days per year for particles (PM_{10}). With this form of standard, the non-overlapping second highest daily value (or the sixth for PM_{10}) becomes the value against which compliance is assessed. If this value is greater than the standard then non-compliance is reported.

All days where a particular standard for a pollutant has been exceeded are listed. Also listed are the stations that recorded an exceedence 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.

Carbon monoxide

Table 14: Summary for CO - Daily maximum rolling 8-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date & Hour	2nd Highest Value	2nd Highest Date & Hour
Sydney						
Blacktown	40.9	149	1.7	16-May 03:00	1.5	08-May 03:00
CBD	64.3	230	4.7	10-Jan 03:00	4.5	08-Feb 03:00
Chullora	84.8	303	3.4	01-Jun 01:00	2.1	16-May 03:00
Liverpool	97.3	349	3.0	09-Jun 01:00	3.0	03-Jun 00:00
Macarthur (1)						
Rozelle	94.0	334	2.2	01-Jun 03:00	2.1	03-Jul 04:00
Illawarra						
Wollongong	97.3	352	2.1	05-Jan 18:00	1.7	09-Jun 00:00
Lower Hunter						
Newcastle	97.0	351	2.4	08-May 03:00	2.2	23-Jun 03:00

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

(1) Instrument to be installed. Data reported from Liverpool in the interim.

Carbon monoxide levels are well below the Ambient Air Quality NEPM standard. The highest recorded value in the state was at the CBD peak monitoring station, and was only 52 per cent of the standard. Levels in all regions are significantly lower than the Ambient Air Quality NEPM standard.

Nitrogen dioxide

Table 15: Summary for NO_2 - Daily maximum 1-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date & Hour	2nd Highest Value	2nd Highest Date & Hour
Sydney						
Blacktown	39.3	149	0.048	07-May 19:00	0.045	30-Mar 20:00
Bringelly	91.1	345	0.041	16-Apr 19:00	0.037	27-Aug 19:00
Chullora	84.3	315	0.056	30-Nov 19:00	0.055	29-Jun 09:00
Liverpool Macarthur (1)	93.7	358	0.060	30-Nov 21:00	0.057	20-Feb 20:00
Richmond	88.4	336	0.037	30-Mar 21:00	0.035	07-May 19:00
Rozelle	89.2	340	0.064	21-Feb 09:00	0.063	27-Sep 12:00
Woolooware	59.9	230	0.054	09-Mar 10:00	0.053	06-Feb 10:00
Central Coast (2)						
Illawarra						
Albion Park	91.4	348	0.044	09-Jun 17:00	0.043	21-Sep 18:00
Wollongong	92.2	355	0.044	16-Apr 19:00	0.044	09-Feb 15:00
Lower Hunter						
Newcastle	91.0	347	0.044	13-Oct 22:00	0.040	12-Oct 21:00
Maitland (3)						
Wallsend	92.2	348	0.041	27-Sep 19:00	0.040	08-May 19:00

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

(1) Station established November 2004. Data reported from Liverpool until station fully operational.

(2) Station to be established.

(3) Station to be established. Data reported from Wallsend in the interim.

Levels of nitrogen dioxide are well below the Ambient Air Quality NEPM standard in all regions of NSW. The highest recorded value in the state was 0.064 ppm (53 per cent of the standard) at the Rozelle station.

Ozone

Table 16: Summary for O_3 - Daily maximum 1-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date & Hour	2nd Highest Value	2nd Highest Date & Hour
Sydney						
Blacktown	39.5	151	**0.123**	07-Feb 14:00	**0.101**	20-Mar 15:00
Bringelly	91.1	348	**0.122**	07-Feb 15:00	**0.111**	27-Nov 16:00
Chullora	87.2	328	**0.105**	06-Feb 15:00	0.100	28-Nov 11:00
Liverpool	92.3	351	**0.113**	06-Feb 16:00	**0.111**	15-Feb 16:00
Macarthur (1)						
Oakdale	85.6	325	**0.124**	07-Feb 16:00	**0.113**	27-Nov 17:00
Richmond	89.5	341	0.096	07-Feb 16:00	0.095	06-Feb 18:00
Rozelle	88.9	340	0.094	28-Nov 11:00	0.083	01-Dec 12:00
St Marys	93.6	353	**0.142**	07-Feb 15:00	**0.107**	01-Jan 14:00
Woolooware	60.2	231	**0.108**	21-Jan 08:00	0.093	10-Jan 14:00
Central Coast (2)						
Illawarra						
Albion Park	93.5	360	**0.112**	10-Jan 17:00	0.090	06-Feb 15:00
Kembla Grange	91.3	348	**0.120**	30-Nov 14:00	**0.115**	10-Jan 16:00
Wollongong	92.5	356	**0.103**	10-Jan 16:00	0.094	30-Nov 14:00
Lower Hunter						
Maitland (3)						
Newcastle	92.3	352	**0.112**	21-Feb 14:00	0.076	26-Mar 17:00
Wallsend	88.2	333	**0.103**	21-Feb 14:00	0.083	28-Nov 14:00
Regional						
Bathurst	89.9	340	0.092	02-Jan 21:00	0.076	13-Feb 18:00

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

Bold font indicates values that exceed the AAQ NEPM standard

(1) Station established November 2004. Data reported from Liverpool until station fully operational.

(2) Station to be established

(3) Station to be established. Data reported from Wallsend in the interim.

Table 17: Summary for O_3 - Daily maximum rolling 4-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date & Hour	2nd Highest Value	2nd Highest Date & Hour
Sydney						
Blacktown	41.3	151	**0.107**	07-Feb 15:00	**0.087**	20-Mar 16:00
Bringelly	95.1	347	**0.110**	07-Feb 16:00	**0.093**	24-Jan 15:00
Chullora	91.2	329	**0.086**	06-Feb 17:00	**0.082**	30-Nov 16:00
Liverpool	96.4	351	**0.092**	15-Feb 16:00	**0.089**	07-Feb 15:00
Macarthur (1)						
Oakdale	89.2	325	**0.099**	07-Feb 17:00	**0.093**	28-Jan 17:00
Richmond	93.8	341	**0.088**	07-Feb 17:00	0.074	20-Mar 17:00
Rozelle	92.9	340	**0.087**	28-Nov 12:00	0.072	13-Oct 14:00
St Marys	97.8	358	**0.128**	07-Feb 16:00	**0.094**	01-Jan 15:00
Woolooware	62.4	231	**0.084**	10-Jan 15:00	0.071	21-Jan 15:00
Central Coast (2)						
Illawarra						
Albion Park	97.5	360	**0.092**	10-Jan 17:00	0.080	06-Feb 16:00
Kembla Grange	95.4	348	**0.100**	06-Feb 17:00	**0.095**	10-Jan 17:00
Wollongong	96.3	356	**0.090**	10-Jan 17:00	**0.088**	30-Nov 16:00
Lower Hunter						
Maitland (3)						
Newcastle	96.4	352	0.073	26-Mar 17:00	0.071	21-Feb 15:00
Wallsend	92.0	333	0.078	28-Nov 15:00	0.072	26-Mar 17:00
Regional						
Bathurst	93.7	340	0.067	02-Jan 23:00	0.065	13-Feb 19:00

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

Bold font indicates values that exceed the AAQ NEPM standard

(1) Station established November 2004. Data reported from Liverpool until station fully operational.

(2) Station to be established.

(3) Station to be established. Data reported from Wallsend in the interim.

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 variability in annual 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 Ambient Air Quality NEPM standards were exceeded in the Sydney and the Illawarra regions. The 1-hour standard was exceeded in the lower Hunter region on one occasion; the 4-hour standard was not exceeded. There were no exceedences of either standard in Bathurst.

The 1-hour standard was exceeded at seven of the ten Sydney monitoring stations: Blacktown, Bringelly, Chullora, Liverpool, Oakdale, St Marys and Woolooware. Of these, Oakdale recorded the highest number of exceedences with seven days where hourly averages were greater than the standard. The maximum 1-hour average during the year was 0.142 ppm recorded at St Marys on the 7th February. Macarthur, Richmond and Rozelle did not exceed the 1-hour standard.

In the Illawarra and lower Hunter regions all stations exceeded the 1-hour standard on at least one day. At Kembla Grange the standard was exceeded on three days during the year (10th January, 6th February and 30th November). All other stations in the Illawarra and lower Hunter recorded exceedences on only one day during the year (10th January in the Illawarra and the 21st February in the lower Hunter).

Table 18: Days when O_3 1-hour Ambient Air Quality NEPM standard exceeded

Date	Stations where standard exceeded (and number of hours)	Comments(#)
1-Jan-2004	Oakdale (1), St Marys (2)	
9-Jan-2004	Bringelly (1), Oakdale (1),	Bushfires near Wilton in the Wollondilly shire
10-Jan-2004	Albion Park (2), Kembla Grange (1), Wollongong (2)	
21-Jan-2004	Woolooware (1)	
22-Jan-2004	Bringelly (1)	
24-Jan-2004	Bringelly (1)	
28-Jan-2004	Oakdale (1)	
6-Feb-2004	Chullora (1), Liverpool (1), Oakdale (1), Kembla Grange (2)	
7-Feb-2004	Blacktown (3), Bringelly (3), Oakdale (1), St Marys (4)	
10-Feb-2004	Bringelly (1), Oakdale (1)	
15-Feb-2004	Liverpool (2)	
21-Feb-2004	Newcastle (1), Wallsend (1)	
20-Mar-2004	Blacktown (1), St Marys (1)	
27-Nov-2004	Bringelly (1), Oakdale (2)	
30-Nov-2004	Liverpool (1), Kembla Grange (1)	

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

The 4-hour standard was exceeded at all stations in Sydney the Illawarra region. Six stations in Sydney (Blacktown, Bringelly, Chullora, Liverpool, Oakdale, St Marys) and two stations in the Illawarra (Kembla Grange, Wollongong) exceeded the standard on two or more days. The maximum value recorded in Sydney was 0.128 ppm at St Marys on the 7th February. The maximum in the Illawarra was 0.100 ppm recorded at Kembla Grange on the 6th February. There were no exceedences of the 4-hour standard at Bathurst or in the lower Hunter region.

Table 19: Days when O_3 4-hour Ambient Air Quality NEPM standard exceeded

Date	Stations where standard exceeded (and number of 4-hour periods)	Comments(#)
1-Jan-2004	Blacktown (1), Oakdale (4), St Marys (3)	
2-Jan-2004	Oakdale (1)	
9-Jan-2004	Bringelly (3), Oakdale (2)	Bushfires near Wilton in the Wollondilly shire
10-Jan-2004	Woolooware (3), Albion Park (4), Kembla Grange (4), Wollongong (4)	
24-Jan-2004	Bringelly (1)	
28-Jan-2004	Bringelly (1), Oakdale (4)	
6-Feb-2004	Blacktown (2), Bringelly (3), Chullora (3), Liverpool (3), Kembla Grange (4)	
7-Feb-2004	Blacktown (5), Bringelly (5), Liverpool (3), Oakdale (5), Richmond (4), St Marys (6)	
10-Feb-2004	Bringelly (1), Oakdale (3)	
15-Feb-2004	Liverpool (2)	
20-Feb-2004	Liverpool (1)	
20-Mar-2004	Blacktown (2)	
27-Nov-2004	Bringelly (2), Chullora (1), Liverpool (2), Oakdale (3), St Marys (1)	
28-Nov-2004	Chullora (2), Rozelle (2), St Marys (2)	
30-Nov-2004	Chullora (1), Kembla Grange (3), Wollongong (3)	

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

Action for Air, the NSW Government's Air Quality Management Plan for Sydney, the Lower Hunter and the Illawarra, sets out a program of measures that target ground level ozone in summer. The Plan covers strategies designed to reduce emissions from industry, motor vehicles and domestic/commercial sources. These include the Cleaner Vehicles Action Plan; emission limits and load based licensing for industrial facilities; the Cleaner Industries Program; and the Clean Air Program. A number of other measures are also being pursued as part of the ozone management strategy, including reducing the volatility of petrol in summer and vapour recovery at service stations and bulk terminals. See More Detailed Information on Programs (page 82) for greater detail regarding the programs and strategies under Action for Air.

Sulfur dioxide

Table 20: Summary for SO_2 - Daily maximum 1-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date & Hour	2nd Highest Value	2nd Highest Date & Hour
Sydney						
Blacktown	39.1	148	0.016	16-Apr 01:00	0.013	05-Feb 09:00
Bringelly	90.8	347	0.015	05-Feb 09:00	0.013	20-Apr 15:00
Chullora (1)						
Macarthur (1)						
Richmond	89.7	340	0.021	01-Jun 18:00	0.014	03-Jul 17:00
Woolooware	60.7	233	0.020	16-Apr 13:00	0.020	23-Jun 16:00
Central Coast (2)						
Illawarra						
Albion Park	92.9	355	0.034	11-Oct 17:00	0.033	01-Nov 17:00
Warrawong	91.4	349	0.088	24-Jul 20:00	0.045	13-Aug 09:00
Wollongong	92.8	356	0.053	05-Jan 13:00	0.031	25-Jan 14:00
Lower Hunter						
Maitland (3)						
Newcastle (1)						
Wallsend	90.1	340	0.067	09-Jun 13:00	0.048	25-Mar 15:00

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

(1) Instrument to be installed in 2005.
(2) Station to be established.
(3) Station to be established. Data reported from Wallsend in the interim.

Table 21: Summary for SO_2 - Maximum 24-hour average concentrations (2004)

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						
Blacktown	40.4	148	0.004	16-Apr	0.004	06-Feb
Bringelly	94.8	347	0.002	05-Feb	0.002	14-Apr
Chullora (1)						
Macarthur (1)						
Richmond	92.9	340	0.003	01-Jun	0.003	13-Aug
Woolooware	63.7	233	0.006	16-Apr	0.004	23-Jun
Central Coast (2)						
Illawarra						
Albion Park	97.0	355	0.009	04-Jan	0.008	06-Feb
Warrawong	95.4	349	0.012	24-Jul	0.007	16-Apr
Wollongong	97.3	356	0.015	05-Jan	0.007	03-Feb
Lower Hunter						
Maitland (3)						
Newcastle (1)						
Wallsend	92.9	340	0.014	19-Jul	0.009	23-Jun

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

(1) Instrument to be installed in 2005.

(2) Station to be established.

(3) Station to be established. Data reported from Wallsend in the interim.

SO_2 levels are significantly below the 1-hour, 24-hour and annual Ambient Air Quality NEPM standards. Warrawong recorded the highest 1-hour value with 0.088 ppm (44 percent of the standard). The highest 24-hour average was recorded at Wollongong, 0.015 ppm (19 percent of the standard). Wallsend recorded the highest annual average of 0.002 ppm, which is merely 10 percent of the standard.

Particles as PM_{10}

Table 22: Summary for PM_{10} – Maximum 24-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (ppm)			
			Highest Value	Highest Date	6th Highest Value	6th Highest Date
Sydney						
Blacktown	35.8	131	42.6	21-Feb	38.5	18-May
Bringelly	93.4	342	**60.3**	09-Jan	43.1	01-Dec
Chullora	90.4	331	**57.5**	10-Jan	47.2	09-Feb
Liverpool	91.8	336	**60.5**	09-Jan	45.6	21-Feb
Macarthur (1)						
Oakdale (2)	56.6	207	41.3	01-Dec	24.7	21-Dec
Richmond	96.2	352	46.2	21-Feb	39.3	23-May
Rozelle	92.6	339	**51.4**	21-Feb	40.0	26-Mar
Wooloowware	64.5	236	40.8	21-Feb	33.4	03-Apr
Central Coast (3)						
Illawarra						
Albion Park	95.9	351	**51.5**	21-Feb	42.3	26-Mar
Kembla Grange (2)	57.4	210	**57.6**	13-Oct	41.4	18-Nov
Wollongong	97.3	356	48.1	08-Mar	44.1	10-Jan
Lower Hunter						
Beresfield	87.2	319	**55.7**	01-Dec	44.1	14-May
Maitland (4)						
Newcastle (2)	19.4	71	46.9	20-Dec	34.9	28-Nov
Regional						
Albury	76.8	281	**55.6**	15-Apr	41.6	29-Mar
Bathurst	88.5	324	**72.9**	14-Apr	46.9	06-May
Dubbo (3)						
Lismore (3)						
Orange (3)						
Tamworth	79.5	291	**55.7**	29-Sep	40.2	07-Jan
Wagga Wagga	91.0	333	**105.9**	29-Mar	**68.9**	14-May

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

Bold font indicates values that exceed the AAQ NEPM standard

(1) Station established November 2004. Data reported from Liverpool until station fully operational

(2) Instrument installed 2004.

(3) Station to be established.

(4) Station to be established. Data reported from Beresfield in the interim.

Table 23: Days when PM_{10} 24-hour Ambient Air Quality NEPM standard exceeded

Date	Stations where standard exceeded	Comments(#)
9-Jan-2004	Bringelly, Liverpool	Bushfires (Ku-ring-ai National Park and Wilton)
10-Jan-2004	Chullora, Bringelly	
21-Feb-2004	Chullora, Rozelle, Albion Park	
22-Feb-2004	Tamworth	
26-Mar-2004	Bathurst, Wagga Wagga	
14-Apr-2004	Bathurst, Wagga Wagga	
15-Apr-2004	Albury, Wagga Wagga	
23-Apr-2004	Bathurst, Wagga Wagga	
7-May-2004	Bathurst, Wagga Wagga	
15-May-2004	Albury, Wagga Wagga	
29-Sep-2004	Tamworth	
13-Oct-2004	Kembla Grange	
1-Dec-2004	Macarthur, Beresfield	

(#) Events that can be clearly identified as influencing pollution levels
Wagga Wagga recorded exceedences on 28 days. On 22 of these days Wagga Wagga was the only station in NSW to record an exceedences (8-Feb, 11-Feb, 20-Feb, 19-Mar, 24-Mar, 25-Mar, 27-Mar, 29-Mar, 1-Apr, 2-Apr, 3-Apr, 16-Apr, 20-Apr, 21-Apr, 22-Apr, 6-May, 8-May, 11-May, 14-May, 16-May, 30-Nov, 27-Dec)

The continuing drought conditions experienced across NSW were a major influence on particle levels across the state during 2004. Bushfires and dust storms had significant impact on particle levels throughout NSW. All regions recorded exceedences of the Ambient Air Quality NEPM standard, however with the exception of Wagga Wagga, no region recorded exceedences on more than the five days allowed. Wagga Wagga recorded exceedences on twenty-eight days during 2004.

In Sydney exceedences of the standard were observed on the 9th January, 10th January, 21st February and the 1st December. The high PM_{10} levels recorded on the 9-10th January were caused by fires on the outskirts of Sydney, particularly southwest of Sydney at Wilton (over 550 ha burnt) and north of Sydney in the Ku-ring-gai National Park (over 800 ha burnt). The highest levels of PM_{10} recorded in Sydney during the year were due to these fires (60.5 $\mu g/m^3$ at Liverpool on the 9th January).

In the Illawarra region the Ambient Air Quality NEPM standard was exceeded on two days, the 21st February and 13th October. The maximum value recorded for the year was 57.6 $\mu g/m^3$ at Kembla Grange on the 13th October. This was a localised event. PM_{10} levels elsewhere in the Illawarra on this day were well below the standard: 22.2 $\mu g/m^3$ at Albion Park and 30.8 $\mu g/m^3$ at Wollongong.

PM_{10} levels in regional centres are influenced by agricultural activities and the use of solid fuel heaters. The highest PM_{10} level recorded in NSW during 2004 was 105.9 $\mu g/m^3$ at Wagga Wagga on the 29th March. Elevated PM_{10} levels occur more frequently at Wagga Wagga than elsewhere in NSW. During 2004 at Wagga Wagga the standard was exceeded on 28 days. On 22 of these days Wagga Wagga was the only station in NSW to report PM_{10} levels higher that the standard. The majority of these days were in the months February to May. This period is when agricultural activities such as broad acre cultivation and preparation of land for winter cropping take place.

With the exception of Wagga Wagga, and even considering climatological effects, PM_{10} levels are generally below the goal set by the Ambient Air Quality NEPM. Nevertheless the Department of Environment and Conservation continues to work towards reducing emissions of anthropogenically-produced particles. The Government's key strategies in the management of particle emissions are outlined in More Detailed Information on Programs (page 82).

Recently, the management of particles from burning, particularly from the use of domestic solid fuel heaters, has been a major focus of these strategies. In addition to the DEC ongoing public education campaign "Don't light tonight unless your heater is right", which informs people how to use their wood heaters more efficiently, a Woodsmoke Reduction Program has been established in regional NSW in recent years.

The Woodsmoke Reduction Program enabled a number of regional councils to run local woodsmoke reduction programs during the winters of 2002, 2003 and 2004. The following councils participated for one year or more in the Woodsmoke Reduction Program: Armidale Dumaresq, Bathurst, Blue Mountains, Cooma-Monaro, Dubbo, Eurobodalla, Goulburn Mulwaree, Gunning (Upper Lachlan), Hastings, Hunter Councils Inc, Inverell, Lithgow, Mudgee (Mid-Western Regional), Orange, Queanbeyan, Shoalhaven, Tumut, Wagga Wagga and Wingecarribee.

Council officers used a wide range of publicity initiatives to raise awareness in the local community about the health and environmental impacts of woodsmoke and the importance of correct woodheater operation. "Smoky chimney surveys" were highly effective in fostering improved woodheater operation and so reducing the number of excessively smoky chimneys. The cash incentives component of the program succeeded in replacing 2024 older type woodheaters with cleaner heating alternatives over the three years of the program, resulting in a reduction of over 60 tonnes of particle pollution.

These woodsmoke initiatives are supported by the Clean Air Regulation under the Protection of the Environment Operations (POEO) Act, which requires that new wood heaters meet the emissions limits in the Australian Standard. Under currently proposed amendments to the POEO Act, local council officers will be able to issue Smoke Abatement Notices where "excessive smoke" is emitted from chimneys on residential premises. It will be an offence for a person to fail to comply with a Smoke Abatement Notice, and council officers may issue on-the-spot fines for this offence. Under the State's planning legislation, councils have the power to limit or ban the installation of wood heaters.

Under particular meteorological conditions, open burning can make a significant contribution to particle pollution. State legislation and guidelines are in place to help minimise the impact of open burning. For example, regulations are in place that effectively ban backyard burning in metropolitan areas and require approval for other burning in the open, although hazard reduction burning is specifically exempted from these regulations. In addition, on specific days when elevated levels of particles are expected, the DEC has the power to ban burning in the open through "No Burn" notices. However, the DEC consults with NSW Rural Fire service to ensure that strategic hazard reduction burns are exempted from such bans where appropriate.

Lead

Lead levels in New South Wales continue to be significantly below the Ambient Air Quality NEPM goal. For the previous three years the highest annual average recorded in New South Wales was $0.09\mu g/m^3$ at Wallsend in 2003, only 18% of the standard. Annual averages throughout New South Wales are now typically less than $0.03\mu g/m^3$ with many 24-hour average samples below the minimum detection limit for lead using ICP-AES analysis ($0.007\mu g/m^3$).

Statistical summary and trends

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

For stations that have data sets of several years or more, trend data, in the form of annual maximums, are provided for each standard for each pollutant. 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 24: Statistical summary for CO - Daily maximum rolling 8-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Blacktown	40.9	1.7	1.5	1.3	1.1	0.8	0.4	0.1	0.0
CBD	64.3	4.7	4.4	4.3	3.7	3.5	3.1	2.6	2.2
Chullora	84.8	3.4	2.1	1.9	1.6	1.3	0.8	0.5	0.3
Liverpool	97.3	3.0	2.7	2.4	2.1	1.4	0.9	0.5	0.3
Macarthur (1)									
Rozelle	94.0	2.2	1.8	1.7	1.3	1.0	0.7	0.4	0.3
Illawarra									
Wollongong	97.3	2.1	1.5	1.4	1.2	1.0	0.7	0.5	0.3
Lower Hunter									
Newcastle	97.0	2.4	1.7	1.6	1.3	1.1	0.6	0.3	0.2

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

(1) Instrument to be installed. Data reported from Liverpool in the interim.

Trend analysis

Table 25: Daily maximum rolling 8-hour average concentrations for CO (ppm)

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Blacktown	4.9	4.2	4.5	4.7	3.5	3.1	2.6	3.0	2.5	1.7
CBD	**9.4**	**9.1**				8.0	5.1	4.8	4.7	4.7
Chullora									2.2	3.4
Liverpool	5.7	4.3	5.9	5.4	4.0	4.8	3.5	3.6	5.5	3.0
Rozelle	6.1	5.7	6.5	5.9	4.0	4.5	3.2	2.8	2.2	2.2
Illawarra										
Wollongong	4.9	3.2	3.5	2.2	2.4	2.4	4.2	2.3	2.1	2.1
Lower Hunter										
Newcastle	4.4	4.8	2.9	4.3	3.3	3.1	4.0	3.2	2.8	2.4

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Blacktown

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	95.4	0	4.9	3.6	3.4	2.9	2.3	1.5	0.9	0.6
1996	83.6	0	4.2	3.0	2.8	2.1	1.6	1.1	0.7	0.5
1997	91.9	0	4.5	3.2	2.5	2.1	1.8	1.4	0.9	0.6
1998	89.6	0	4.7	4.0	3.8	2.5	2.1	1.2	0.7	0.4
1999	98.2	0	3.5	3.0	2.7	2.1	1.8	1.2	0.6	0.2
2000	92.3	0	3.1	2.4	2.3	2.0	1.6	1.0	0.4	0.2
2001	95.5	0	2.6	1.9	1.8	1.6	1.3	0.8	0.3	0.2
2002	94.5	0	3.0	2.4	2.0	1.8	1.3	0.6	0.3	0.1
2003	93.6	0	2.5	1.9	1.6	1.2	0.8	0.4	0.1	0.0
2004	40.9	0	1.7	1.5	1.3	1.1	0.8	0.4	0.1	0.0

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

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

Station: CBD

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	91.0	**7**	**9.4**	**9.2**	8.9	8.4	8.0	7.4	6.6	5.4
1996	27.4	1	**9.1**	8.7	8.6	8.2	7.8	7.3	6.3	5.3
1997	0.0									
1998	0.0									
1999	0.0									
2000	69.5	0	8.0	6.5	5.5	4.7	4.3	3.7	3.0	2.3
2001	81.6	0	5.1	4.5	4.4	4.0	3.7	3.3	2.7	2.1
2002	82.9	0	4.8	3.9	3.8	3.6	3.4	3.0	2.5	2.1
2003	82.3	0	4.7	4.2	4.2	3.8	3.5	3.1	2.6	1.9
2004	64.3	0	4.7	4.4	4.3	3.7	3.5	3.1	2.6	2.2

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: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	92.5	0	5.7	5.1	4.7	4.0	3.2	2.2	1.1	0.7
1996	73.7	0	4.3	3.7	3.5	2.7	2.0	1.4	0.9	0.6
1997	75.7	0	5.9	5.0	4.6	3.6	2.9	1.8	0.9	0.5
1998	74.6	0	5.4	4.5	4.1	3.1	2.5	1.5	0.9	0.6
1999	81.6	0	4.0	3.9	3.6	3.1	2.5	1.6	0.8	0.5
2000	98.0	0	4.8	3.6	3.3	2.8	2.1	1.3	0.9	0.5
2001	98.1	0	3.5	2.9	2.8	2.6	1.8	1.1	0.7	0.5
2002	85.6	0	3.6	3.0	2.9	2.4	1.9	1.2	0.7	0.5
2003	93.4	0	5.5	3.1	2.8	2.2	1.6	1.0	0.6	0.4
2004	97.3	0	3.0	2.7	2.4	2.1	1.4	0.9	0.5	0.3

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

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

Station: Rozelle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	87.0	0	6.1	4.4	3.8	3.2	2.3	1.5	0.9	0.6
1996	82.1	0	5.7	3.5	3.4	3.0	2.1	1.2	0.8	0.6
1997	84.7	0	6.5	5.7	3.8	2.5	2.0	1.2	0.8	0.6
1998	92.9	0	5.9	5.0	4.0	2.8	2.2	1.3	0.9	0.6
1999	83.3	0	4.0	2.5	2.5	2.0	1.6	1.0	0.6	0.4
2000	90.0	0	4.5	2.4	2.3	1.7	1.3	0.8	0.5	0.4
2001	95.0	0	3.2	2.4	2.1	1.7	1.3	0.7	0.5	0.3
2002	87.5	0	2.8	1.7	1.6	1.3	1.1	0.7	0.5	0.3
2003	93.1	0	2.2	1.5	1.4	1.1	0.9	0.6	0.4	0.3
2004	94.0	0	2.2	1.8	1.7	1.3	1.0	0.7	0.4	0.3

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

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

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	53.0	0	4.4	3.9	3.4	2.6	2.1	1.0	0.6	0.3
1996	48.8	0	4.8	4.0	3.6	1.9	1.5	0.9	0.5	0.3
1997	15.8	0	2.9	2.4	2.2	2.1	1.6	1.0	0.5	0.3
1998	75.5	0	4.3	3.0	2.7	2.1	1.4	0.7	0.3	0.1
1999	67.6	0	3.3	2.8	2.5	1.7	1.0	0.3	0.1	0.0
2000	83.1	0	3.1	2.8	2.6	2.0	1.3	0.7	0.4	0.2
2001	96.7	0	4.0	2.6	2.4	1.7	1.4	0.7	0.4	0.3
2002	94.6	0	3.2	2.1	1.9	1.4	1.0	0.6	0.4	0.3
2003	93.0	0	2.8	2.0	1.8	1.5	1.0	0.6	0.3	0.2
2004	97.0	0	2.4	1.7	1.6	1.3	1.1	0.6	0.3	0.2

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

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

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	57.1	0	4.9	3.2	2.7	2.5	2.1	1.4	1.0	0.6
1996	93.2	0	3.2	2.7	2.5	2.0	1.7	1.2	0.7	0.5
1997	36.3	0	3.5	3.1	2.9	2.6	2.1	1.3	0.7	0.5
1998	97.1	0	2.2	2.1	2.0	1.8	1.4	1.0	0.6	0.4
1999	98.2	0	2.4	2.2	2.1	1.6	1.3	0.9	0.6	0.4
2000	98.7	0	2.4	1.9	1.7	1.4	1.2	0.8	0.5	0.3
2001	97.6	0	4.2	1.7	1.5	1.1	1.0	0.7	0.5	0.3
2002	91.2	0	2.3	1.9	1.7	1.5	1.2	0.9	0.5	0.3
2003	96.4	0	2.1	1.7	1.5	1.3	1.0	0.7	0.5	0.3
2004	97.3	0	2.1	1.5	1.4	1.2	1.0	0.7	0.5	0.3

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

Nitrogen Dioxide

Statistical summary

Table 32: Statistical summary for NO_2 - Daily maximum 1-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Blacktown	39.3	0.048	0.043	0.043	0.039	0.036	0.030	0.024	0.019
Bringelly	91.1	0.041	0.031	0.029	0.026	0.022	0.017	0.013	0.010
Chullora	84.3	0.056	0.051	0.050	0.044	0.041	0.034	0.028	0.023
Liverpool	93.7	0.060	0.050	0.048	0.042	0.036	0.031	0.025	0.021
Macarthur (1)	16.2	0.052	0.050	0.045	0.039	0.031	0.024	0.020	0.016
Richmond	88.4	0.037	0.034	0.033	0.029	0.027	0.021	0.015	0.012
Rozelle	89.2	0.064	0.051	0.047	0.042	0.037	0.031	0.025	0.019
Woolooware	59.9	0.054	0.050	0.042	0.037	0.030	0.025	0.021	0.014
Central Coast (2)									
Illawarra									
Albion Park	91.4	0.044	0.036	0.034	0.027	0.021	0.016	0.011	0.006
Wollongong	92.2	0.044	0.039	0.038	0.033	0.029	0.026	0.021	0.015
Lower Hunter									
Newcastle	91.0	0.044	0.037	0.035	0.032	0.029	0.025	0.020	0.012
Maitland (3)									
Wallsend	92.2	0.041	0.035	0.033	0.029	0.027	0.023	0.017	0.013

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

(1) Station established November 2004.

(2) Station to be established.

(3) Station to be established. Data reported from Wallsend in the interim.

Trend analysis

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

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Blacktown	0.063	0.059	0.096	0.060	0.058	0.070	0.058	0.057	0.055	0.048
Bringelly	0.052	**0.133**	0.060	0.050	0.045	0.045	0.048	0.052	0.044	0.041
Chullora									0.066	0.056
Lidcombe	0.099	0.070	0.080	**0.126**	0.073	0.070	0.071	0.052		
Liverpool	0.088	0.054	0.060	0.063	0.054	0.079	0.067	0.068	0.064	0.060
Macarthur										0.052
Richmond	0.045	0.040	0.064	0.053	0.044	0.037	0.038	0.048	0.036	0.037
Rozelle	0.089	0.075	0.082	0.081	0.062	0.070	0.066	0.086	0.052	0.064
Woolooware	0.075	0.063	0.090	0.067	0.060	0.060	0.060	0.066	0.054	0.054
Illawarra										
Albion Park	0.060	0.067	0.044	0.081	0.049	0.055	0.051	0.048	0.048	0.044
Wollongong	0.066	0.056	0.064	0.058	0.062	0.065	0.056	0.056	0.049	0.044
Lower Hunter										
Newcastle	0.049	0.044	0.048	0.039	0.049	0.044	0.040	0.047	0.039	0.044
Wallsend	0.057	0.044	0.058	0.035	0.034	0.054	0.044	0.043	0.050	0.041

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	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Blacktown	0.016	0.014	0.015	0.015	0.014	0.013	0.013	0.014	0.013	0.013
Bringelly	0.008	0.007	0.007	0.006	0.007	0.007	0.006	0.009	0.007	0.006
Chullora									0.016	0.016
Lidcombe	0.017	0.015	0.015	0.016	0.016	0.015	0.016	0.013		
Liverpool	0.015	0.012	0.014	0.014	0.014	0.014	0.014	0.015	0.013	0.013
Macarthur										0.009
Richmond	0.007	0.008	0.008	0.007	0.007	0.006	0.007	0.007	0.007	0.007
Rozelle	0.018	0.019	0.020	0.016	0.015	0.014	0.014	0.015	0.014	0.014
Woolooware	0.011	0.010	0.011	0.010	0.010	0.010	0.009	0.010	0.009	0.009
Illawarra										
Albion Park	0.006	0.005	0.004	0.004	0.004	0.005	0.004	0.004	0.005	0.004
Wollongong	0.011	0.011	0.011	0.010	0.011	0.010	0.010	0.011	0.010	0.009
Lower Hunter										
Newcastle	0.011	0.010	0.009	0.008	0.009	0.009	0.009	0.009	0.008	0.009
Wallsend	0.010	0.009	0.006	0.008	0.009	0.008	0.009	0.009	0.008	0.008

AAQ NEPM Standard - 0.03 ppm (Annual average)

Table 35: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Blacktown

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	89.9	0	0.063	0.056	0.052	0.048	0.042	0.035	0.028	0.023
1996	77.7	0	0.059	0.049	0.047	0.042	0.039	0.032	0.026	0.021
1997	73.0	0	0.096	0.055	0.051	0.045	0.039	0.033	0.028	0.022
1998	84.6	0	0.060	0.050	0.048	0.043	0.039	0.031	0.026	0.021
1999	90.8	0	0.058	0.048	0.047	0.040	0.035	0.030	0.026	0.021
2000	90.3	0	0.070	0.054	0.043	0.039	0.034	0.029	0.024	0.019
2001	93.3	0	0.058	0.047	0.045	0.037	0.034	0.030	0.025	0.020
2002	92.4	0	0.057	0.050	0.046	0.043	0.037	0.032	0.026	0.020
2003	89.8	0	0.055	0.049	0.047	0.038	0.035	0.030	0.025	0.020
2004	39.3	0	0.048	0.043	0.043	0.039	0.036	0.030	0.024	0.019

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

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

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	67.1	0	0.052	0.043	0.040	0.033	0.029	0.022	0.016	0.011
1996	73.5	1	**0.133**	0.038	0.035	0.028	0.025	0.018	0.014	0.011
1997	78.6	0	0.060	0.040	0.034	0.029	0.026	0.020	0.015	0.011
1998	85.1	0	0.050	0.032	0.031	0.028	0.024	0.018	0.014	0.010
1999	90.4	0	0.045	0.037	0.034	0.027	0.025	0.020	0.015	0.011
2000	93.4	0	0.045	0.033	0.029	0.026	0.022	0.019	0.015	0.011
2001	94.4	0	0.048	0.033	0.031	0.026	0.023	0.019	0.015	0.011
2002	93.1	0	0.052	0.041	0.038	0.033	0.029	0.022	0.017	0.012
2003	87.1	0	0.044	0.031	0.028	0.023	0.021	0.017	0.013	0.010
2004	91.1	0	0.041	0.031	0.029	0.026	0.022	0.017	0.013	0.010

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

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 Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995 (1)	80.3	0	0.099	0.069	0.062	0.052	0.046	0.037	0.030	0.022
1996 (1)	64.1	0	0.070	0.049	0.047	0.042	0.038	0.031	0.026	0.022
1997 (1)	83.1	0	0.080	0.060	0.055	0.048	0.042	0.034	0.027	0.021
1998 (1)	69.4	1	**0.126**	0.052	0.050	0.046	0.040	0.031	0.026	0.021
1999 (1)	88.9	0	0.073	0.051	0.047	0.043	0.039	0.035	0.028	0.021
2000 (1)	91.7	0	0.070	0.055	0.051	0.042	0.036	0.030	0.025	0.021
2001 (1)	93.8	0	0.071	0.055	0.050	0.042	0.038	0.033	0.028	0.022
2002 (1)	30.8	0	0.052	0.044	0.040	0.036	0.032	0.027	0.022	0.018
2003 (2)	76.0	0	0.066	0.054	0.048	0.043	0.038	0.033	0.028	0.022
2004 (2)	84.3	0	0.056	0.051	0.050	0.044	0.041	0.034	0.028	0.023

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

(1) Lidcombe station closed 2nd quarter 2002

(2) Chullora station commissioned December 2002

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

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	89.3	0	0.088	0.061	0.057	0.048	0.041	0.033	0.027	0.021
1996	88.0	0	0.054	0.049	0.042	0.038	0.035	0.028	0.022	0.018
1997	86.2	0	0.060	0.055	0.051	0.043	0.039	0.031	0.026	0.019
1998	85.1	0	0.063	0.050	0.046	0.040	0.035	0.028	0.022	0.018
1999	87.9	0	0.054	0.046	0.044	0.041	0.038	0.032	0.027	0.021
2000	89.2	0	0.079	0.057	0.049	0.042	0.036	0.030	0.025	0.021
2001	94.3	0	0.067	0.051	0.045	0.043	0.037	0.031	0.027	0.021
2002	93.0	0	0.068	0.051	0.047	0.045	0.040	0.033	0.028	0.022
2003	89.2	0	0.064	0.047	0.042	0.038	0.034	0.028	0.024	0.020
2004	93.7	0	0.060	0.050	0.048	0.042	0.036	0.031	0.025	0.021

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

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

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	58.1	0	0.045	0.032	0.031	0.029	0.027	0.021	0.016	0.011
1996	81.2	0	0.040	0.031	0.031	0.027	0.025	0.022	0.017	0.013
1997	85.9	0	0.064	0.038	0.035	0.031	0.028	0.023	0.020	0.014
1998	84.2	0	0.053	0.037	0.033	0.028	0.025	0.021	0.017	0.013
1999	89.2	0	0.044	0.032	0.029	0.026	0.024	0.021	0.016	0.011
2000	93.3	0	0.037	0.027	0.027	0.025	0.023	0.019	0.015	0.011
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	0.032	0.029	0.027	0.023	0.018	0.012
2003	93.0	0	0.036	0.031	0.029	0.026	0.024	0.021	0.016	0.012
2004	88.4	0	0.037	0.034	0.033	0.029	0.027	0.021	0.015	0.012

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

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

Station: Rozelle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	80.7	0	0.089	0.067	0.063	0.057	0.050	0.037	0.029	0.023
1996	74.2	0	0.075	0.062	0.058	0.048	0.044	0.036	0.030	0.025
1997	70.6	0	0.082	0.076	0.066	0.059	0.051	0.039	0.030	0.026
1998	72.0	0	0.081	0.057	0.053	0.046	0.042	0.033	0.027	0.020
1999	87.4	0	0.062	0.047	0.044	0.041	0.037	0.030	0.025	0.019
2000	94.3	0	0.070	0.057	0.051	0.044	0.038	0.031	0.025	0.020
2001	93.2	0	0.066	0.051	0.049	0.040	0.037	0.032	0.026	0.019
2002	87.1	0	0.086	0.058	0.053	0.045	0.041	0.035	0.027	0.019
2003	88.6	0	0.052	0.047	0.046	0.041	0.038	0.032	0.026	0.020
2004	89.2	0	0.064	0.051	0.047	0.042	0.037	0.031	0.025	0.019

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

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

Station: Woolooware

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	69.4	0	0.075	0.062	0.055	0.049	0.038	0.030	0.021	0.013
1996	77.9	0	0.063	0.048	0.044	0.038	0.033	0.027	0.022	0.014
1997	73.8	0	0.090	0.078	0.069	0.051	0.044	0.037	0.024	0.013
1998	83.7	0	0.067	0.047	0.045	0.039	0.034	0.026	0.020	0.014
1999	91.0	0	0.060	0.049	0.045	0.036	0.032	0.026	0.019	0.012
2000	93.3	0	0.060	0.048	0.046	0.040	0.034	0.026	0.021	0.014
2001	92.9	0	0.060	0.043	0.040	0.036	0.033	0.027	0.021	0.013
2002	92.8	0	0.066	0.051	0.047	0.039	0.035	0.028	0.021	0.012
2003	93.3	0	0.054	0.047	0.044	0.038	0.033	0.026	0.020	0.013
2004	59.9	0	0.054	0.050	0.042	0.037	0.030	0.025	0.021	0.014

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

Table 42: Statistical summary for NO_2 - Annual daily maximum 1-hour average concentrations

Station: Albion Park

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	85.9	0	0.060	0.053	0.049	0.040	0.028	0.022	0.015	0.008
1996	76.8	0	0.067	0.041	0.038	0.031	0.024	0.020	0.014	0.009
1997	29.5	0	0.044	0.033	0.030	0.027	0.024	0.017	0.009	0.003
1998	87.4	0	0.081	0.042	0.038	0.033	0.024	0.017	0.010	0.004
1999	90.4	0	0.049	0.042	0.037	0.031	0.025	0.015	0.009	0.005
2000	90.3	0	0.055	0.044	0.041	0.031	0.024	0.017	0.010	0.005
2001	93.0	0	0.051	0.040	0.035	0.028	0.024	0.017	0.010	0.004
2002	57.5	0	0.048	0.035	0.034	0.029	0.024	0.015	0.008	0.005
2003	90.0	0	0.048	0.039	0.036	0.030	0.023	0.017	0.011	0.006
2004	91.4	0	0.044	0.036	0.034	0.027	0.021	0.016	0.011	0.006

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

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

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	66.6	0	0.066	0.050	0.047	0.042	0.038	0.032	0.023	0.018
1996	88.9	0	0.056	0.041	0.040	0.034	0.030	0.025	0.021	0.017
1997	82.8	0	0.064	0.054	0.047	0.040	0.036	0.028	0.023	0.017
1998	86.9	0	0.058	0.044	0.042	0.036	0.031	0.025	0.021	0.016
1999	90.8	0	0.062	0.046	0.042	0.037	0.032	0.027	0.022	0.016
2000	93.0	0	0.065	0.049	0.043	0.034	0.030	0.025	0.021	0.017
2001	93.6	0	0.056	0.043	0.040	0.037	0.031	0.027	0.022	0.016
2002	94.2	0	0.056	0.048	0.044	0.039	0.036	0.029	0.023	0.016
2003	93.3	0	0.049	0.039	0.036	0.035	0.032	0.027	0.022	0.017
2004	92.2	0	0.044	0.039	0.038	0.033	0.029	0.026	0.021	0.015

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

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

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	80.9	0	0.049	0.042	0.041	0.039	0.036	0.030	0.023	0.015
1996	54.6	0	0.044	0.043	0.037	0.032	0.028	0.024	0.020	0.014
1997	69.3	0	0.048	0.040	0.039	0.035	0.031	0.027	0.020	0.014
1998	83.4	0	0.039	0.035	0.034	0.031	0.029	0.024	0.019	0.011
1999	90.2	0	0.049	0.040	0.038	0.034	0.030	0.025	0.020	0.012
2000	90.1	0	0.044	0.038	0.034	0.031	0.028	0.024	0.018	0.011
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	0.037	0.034	0.031	0.025	0.019	0.012
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	0.037	0.035	0.032	0.029	0.025	0.020	0.012

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

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

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	79.6	0	0.057	0.047	0.045	0.039	0.033	0.028	0.022	0.016
1996	74.8	0	0.044	0.036	0.033	0.030	0.028	0.023	0.018	0.014
1997	11.1	0	0.058	0.028	0.025	0.021	0.019	0.014	0.013	0.011
1998	78.6	0	0.035	0.034	0.030	0.028	0.025	0.022	0.017	0.013
1999	85.6	0	0.034	0.033	0.030	0.027	0.025	0.021	0.017	0.012
2000	91.8	0	0.054	0.037	0.033	0.029	0.026	0.022	0.017	0.012
2001	87.5	0	0.044	0.039	0.036	0.032	0.030	0.024	0.018	0.014
2002	63.2	0	0.043	0.038	0.034	0.029	0.027	0.024	0.018	0.014
2003	85.9	0	0.050	0.037	0.034	0.029	0.027	0.022	0.016	0.013
2004	92.2	0	0.041	0.035	0.033	0.029	0.027	0.023	0.017	0.013

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

Ozone

Statistical summary

Table 46: Statistical summary for O_3 - Daily maximum 1-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Blacktown	39.5	**0.123**	0.093	0.089	0.080	0.066	0.050	0.036	0.028
Bringelly	91.1	**0.122**	**0.104**	0.091	0.074	0.060	0.044	0.033	0.029
Chullora	87.2	**0.105**	0.087	0.074	0.061	0.050	0.038	0.030	0.026
Liverpool	92.3	**0.113**	0.096	0.084	0.068	0.054	0.040	0.030	0.026
Macarthur (1)	16.2	0.099	0.086	0.082	0.070	0.062	0.055	0.038	0.028
Oakdale	85.6	**0.124**	**0.105**	0.089	0.072	0.063	0.047	0.035	0.031
Richmond	89.5	0.096	0.080	0.075	0.065	0.058	0.045	0.034	0.029
Rozelle	88.9	0.094	0.077	0.072	0.056	0.045	0.034	0.027	0.024
St Marys	93.6	**0.142**	0.091	0.082	0.067	0.058	0.044	0.033	0.029
Wooloowaare	60.2	**0.108**	0.072	0.062	0.052	0.041	0.033	0.029	0.025
Central Coast (2)									
Illawarra									
Albion Park	93.5	**0.112**	0.080	0.062	0.051	0.044	0.035	0.030	0.027
Kembla Grange	91.3	**0.120**	0.077	0.060	0.051	0.043	0.036	0.031	0.027
Wollongong	92.5	**0.103**	0.082	0.069	0.055	0.043	0.034	0.029	0.026
Lower Hunter									
Maitland (3)									
Newcastle	92.3	**0.112**	0.068	0.065	0.052	0.044	0.036	0.030	0.025
Wallsend	88.2	**0.103**	0.071	0.065	0.054	0.047	0.037	0.031	0.026
Regional									
Bathurst	89.9	0.092	0.067	0.059	0.054	0.050	0.043	0.034	0.029

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

Bold font indicates values that exceed the AAQ NEPM standard

(1) Station established November 2004.

(2) Station to be established

(3) Station to be established. Data reported from Wallsend in the interim.

Table 47: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Blacktown	41.3	**0.107**	**0.082**	0.080	0.070	0.061	0.044	0.033	0.026
Bringelly	95.1	**0.110**	**0.085**	0.078	0.064	0.053	0.041	0.032	0.028
Chullora	91.2	**0.086**	0.077	0.065	0.054	0.045	0.035	0.029	0.024
Liverpool	96.4	**0.092**	**0.080**	0.071	0.059	0.048	0.037	0.029	0.024
Macarthur (1)	16.9	**0.084**	0.077	0.068	0.059	0.054	0.047	0.037	0.027
Oakdale	89.2	**0.099**	**0.088**	0.077	0.064	0.056	0.044	0.034	0.030
Richmond	93.8	**0.088**	0.073	0.067	0.057	0.052	0.042	0.033	0.028
Rozelle	92.9	**0.087**	0.071	0.065	0.050	0.041	0.032	0.026	0.022
St Marys	97.8	**0.128**	0.078	0.067	0.060	0.053	0.041	0.032	0.028
Wooloowware	62.4	**0.084**	0.064	0.054	0.048	0.038	0.032	0.028	0.024
Central Coast (2)									
Illawarra									
Albion Park	97.5	**0.092**	0.073	0.055	0.046	0.040	0.033	0.029	0.026
Kembla Grange	95.4	**0.100**	0.067	0.053	0.047	0.040	0.034	0.030	0.026
Wollongong	96.3	**0.090**	0.067	0.058	0.050	0.040	0.032	0.028	0.025
Lower Hunter									
Maitland (3)									
Newcastle	96.4	0.073	0.061	0.059	0.048	0.041	0.034	0.028	0.024
Wallsend	92.0	0.078	0.064	0.057	0.049	0.044	0.035	0.029	0.025
Regional									
Bathurst	93.7	0.067	0.058	0.055	0.050	0.048	0.041	0.033	0.027

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

Bold font indicates values that exceed the AAQ NEPM standard

(1) Station established November 2004.

(2) Station to be established

(3) Station to be established. Data reported from Wallsend in the interim.

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

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Blacktown	0.059	0.082	**0.149**	**0.109**	0.091	**0.113**	**0.153**	**0.130**	**0.181**	**0.123**
Bringelly	0.081	0.098	**0.135**	**0.113**	**0.114**	**0.130**	**0.175**	**0.118**	**0.155**	**0.122**
Chullora									0.084	**0.105**
Lidcombe	0.083	0.075	**0.168**	**0.142**	0.092	**0.118**	**0.156**	0.100		
Liverpool	0.079	0.092	**0.151**	**0.130**	**0.102**	**0.133**	**0.141**	**0.100**	**0.151**	**0.113**
Macarthur										0.099
Oakdale		**0.111**	**0.152**	**0.109**	**0.107**	**0.126**	**0.135**	0.094	**0.102**	**0.124**
Richmond	0.076	0.093	**0.120**	**0.113**	**0.127**	0.088	**0.117**	**0.125**	**0.148**	0.096
Rozelle	0.078			0.088	0.059	0.080	**0.115**	0.100	0.083	0.094
St Marys	0.068	0.087	**0.124**	**0.122**	**0.113**	**0.158**	**0.146**	**0.119**	0.093	**0.142**
Woolooware	0.098	0.069	**0.159**	**0.115**	0.075	0.095	**0.126**	**0.104**	**0.106**	**0.108**
Illawarra										
Albion Park	0.080	0.062	**0.144**	**0.140**	0.090	**0.106**	0.088	0.094	**0.130**	**0.112**
Kembla Grange	0.089	0.083	**0.124**	**0.137**	**0.101**	**0.117**	**0.119**	0.099	**0.113**	**0.120**
Wollongong	0.097	0.066	**0.120**	**0.105**	0.087	**0.108**	**0.116**	**0.121**	0.097	**0.103**
Lower Hunter										
Newcastle	0.069	0.056	**0.141**	0.080	0.066	0.071	0.072	0.083	0.079	**0.112**
Wallsend	0.052	0.056	**0.129**	0.095	0.069	0.073	0.078	0.081	0.077	**0.103**
Regional										
Bathurst							0.063	0.064	0.056	0.092

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	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Blacktown	0.052	0.071	**0.100**	**0.097**	0.077	**0.101**	**0.120**	**0.107**	**0.157**	**0.107**
Bringelly	0.066	0.076	**0.102**	**0.089**	**0.092**	**0.115**	**0.128**	**0.099**	**0.133**	**0.110**
Chullora									0.077	**0.086**
Lidcombe	0.062	0.065	**0.121**	**0.119**	0.077	**0.095**	**0.137**	**0.084**		
Liverpool	0.067	0.078	**0.116**	**0.108**	**0.084**	**0.107**	**0.120**	**0.089**	**0.132**	**0.092**
Macarthur										**0.084**
Oakdale		**0.088**	**0.133**	**0.092**	**0.090**	**0.098**	**0.105**	**0.080**	**0.089**	**0.099**
Richmond	0.061	0.075	**0.103**	**0.097**	**0.098**	0.078	**0.111**	**0.112**	**0.138**	**0.088**
Rozelle	0.069			0.079	0.053	0.073	**0.083**	**0.087**	0.070	**0.087**
St Marys	0.058	0.080	**0.104**	**0.091**	**0.091**	**0.136**	**0.125**	**0.093**	**0.091**	**0.128**
Woolooware	0.073	0.064	**0.131**	**0.094**	0.071	**0.083**	**0.096**	**0.088**	**0.089**	**0.084**
Illawarra										
Albion Park	0.063	0.053	**0.124**	**0.116**	**0.081**	**0.083**	**0.082**	**0.083**	**0.111**	**0.092**
Kembla Grange	0.063	0.062	**0.099**	**0.117**	**0.081**	**0.089**	**0.092**	**0.083**	**0.107**	**0.100**
Wollongong	0.070	0.055	**0.113**	**0.082**	0.073	**0.086**	**0.091**	**0.099**	**0.080**	**0.090**
Lower Hunter										
Newcastle	0.063	0.054	**0.125**	0.068	0.065	0.065	0.069	0.077	0.061	0.073
Wallsend	0.048	0.053	**0.105**	**0.084**	0.059	0.070	0.073	0.074	0.059	0.078
Regional										
Bathurst							0.060	0.062	0.053	0.067

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

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	95.3	0	0.059	0.054	0.052	0.048	0.042	0.032	0.023	0.017
1996	85.7	0	0.082	0.065	0.060	0.052	0.046	0.033	0.024	0.018
1997	93.7	**4**	**0.149**	0.088	0.075	0.064	0.053	0.036	0.026	0.021
1998	83.8	**3**	**0.109**	0.093	0.083	0.063	0.052	0.038	0.024	0.018
1999	95.1	0	0.091	0.079	0.075	0.063	0.050	0.035	0.026	0.020
2000	91.5	**2**	**0.113**	0.088	0.075	0.061	0.051	0.037	0.028	0.024
2001	93.6	**5**	**0.153**	**0.107**	0.088	0.075	0.054	0.040	0.030	0.024
2002	91.7	**2**	**0.130**	0.093	0.083	0.068	0.059	0.043	0.033	0.026
2003	90.3	**3**	**0.181**	0.085	0.073	0.061	0.050	0.037	0.029	0.025
2004	39.5	**2**	**0.123**	0.093	0.089	0.080	0.066	0.050	0.036	0.028

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	94.6	0	0.081	0.075	0.064	0.057	0.050	0.036	0.026	0.022
1996	94.2	0	0.098	0.077	0.071	0.057	0.049	0.036	0.027	0.022
1997	93.7	**5**	**0.135**	**0.102**	0.087	0.069	0.058	0.044	0.029	0.024
1998	74.5	**4**	**0.113**	**0.101**	0.098	0.078	0.066	0.044	0.029	0.024
1999	92.1	**3**	**0.114**	0.100	0.094	0.073	0.055	0.037	0.029	0.024
2000	94.9	**3**	**0.130**	0.096	0.092	0.070	0.059	0.039	0.032	0.027
2001	91.5	**9**	**0.175**	**0.115**	**0.102**	0.074	0.059	0.042	0.033	0.027
2002	93.0	**2**	**0.118**	0.098	0.090	0.074	0.064	0.045	0.034	0.028
2003	91.3	**3**	**0.155**	0.095	0.076	0.065	0.056	0.041	0.032	0.028
2004	91.1	**6**	**0.122**	**0.104**	0.091	0.074	0.060	0.044	0.033	0.029

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 Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995 (1)	91.6	0	0.083	0.058	0.055	0.045	0.036	0.028	0.019	0.014
1996 (1)	82.1	0	0.075	0.062	0.057	0.047	0.042	0.031	0.022	0.015
1997 (1)	95.1	**2**	**0.168**	0.087	0.083	0.064	0.050	0.034	0.023	0.019
1998 (1)	89.5	**5**	**0.142**	**0.106**	0.080	0.070	0.051	0.034	0.025	0.020
1999 (1)	89.4	0	0.092	0.076	0.065	0.055	0.043	0.031	0.025	0.020
2000 (1)	94.7	1	**0.118**	0.080	0.071	0.058	0.048	0.033	0.026	0.021
2001 (1)	94.5	**4**	**0.156**	0.094	0.085	0.066	0.050	0.035	0.025	0.020
2002 (1)	31.0	0	0.100	0.078	0.074	0.061	0.046	0.037	0.029	0.021
2003 (2)	80.6	0	0.084	0.066	0.063	0.046	0.040	0.034	0.028	0.023
2004 (2)	87.2	1	**0.105**	0.087	0.074	0.061	0.050	0.038	0.030	0.026

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

Bold font indicates values that exceed the AAQ NEPM standard

(1) Lidcombe station closed 2nd quarter 2002

(2) Chullora station commissioned December 2002

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

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	95.6	0	0.079	0.064	0.056	0.048	0.040	0.029	0.020	0.014
1996	95.1	0	0.092	0.069	0.065	0.048	0.039	0.027	0.021	0.015
1997	88.5	**2**	**0.151**	0.090	0.083	0.055	0.044	0.033	0.022	0.016
1998	93.1	**4**	**0.130**	0.098	0.091	0.069	0.055	0.035	0.023	0.018
1999	83.6	1	**0.102**	0.086	0.077	0.064	0.045	0.032	0.025	0.020
2000	93.3	**2**	**0.133**	0.088	0.079	0.069	0.058	0.035	0.028	0.024
2001	94.7	**5**	**0.141**	**0.103**	0.089	0.071	0.053	0.039	0.030	0.025
2002	93.6	1	**0.100**	0.087	0.084	0.064	0.054	0.039	0.030	0.025
2003	93.3	**4**	**0.151**	0.087	0.065	0.054	0.045	0.035	0.029	0.024
2004	92.3	**3**	**0.113**	0.096	0.084	0.068	0.054	0.040	0.030	0.026

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: Oakdale

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	60.7	1	**0.111**	0.068	0.057	0.049	0.041	0.032	0.026	0.023
1997	89.6	**8**	**0.152**	**0.111**	**0.105**	0.079	0.063	0.045	0.031	0.027
1998	54.5	**2**	**0.109**	0.086	0.082	0.062	0.051	0.037	0.027	0.014
1999	89.6	**5**	**0.107**	**0.104**	0.090	0.068	0.055	0.041	0.031	0.027
2000	90.1	**4**	**0.126**	0.100	0.086	0.065	0.055	0.039	0.030	0.027
2001	34.8	**8**	**0.135**	**0.116**	**0.102**	0.072	0.057	0.041	0.034	0.028
2002	18.6	0	0.094	0.088	0.088	0.082	0.075	0.060	0.044	0.033
2003	91.1	1	**0.102**	0.079	0.073	0.063	0.054	0.041	0.033	0.029
2004	85.6	**7**	**0.124**	**0.105**	0.089	0.072	0.063	0.047	0.035	0.031

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	86.2	0	0.076	0.053	0.048	0.044	0.039	0.031	0.025	0.019
1996	91.6	0	0.093	0.065	0.059	0.052	0.046	0.036	0.029	0.023
1997	79.4	**3**	**0.120**	0.094	0.077	0.066	0.056	0.041	0.030	0.026
1998	91.1	1	**0.113**	0.090	0.078	0.067	0.056	0.041	0.031	0.025
1999	92.0	1	**0.127**	0.076	0.074	0.064	0.054	0.040	0.032	0.027
2000	89.7	0	0.088	0.080	0.071	0.062	0.051	0.039	0.030	0.025
2001	90.8	**5**	**0.117**	**0.106**	0.095	0.074	0.057	0.042	0.034	0.028
2002	92.5	**2**	**0.125**	0.094	0.084	0.070	0.063	0.045	0.034	0.029
2003	86.1	**2**	**0.148**	0.083	0.078	0.061	0.053	0.039	0.030	0.026
2004	89.5	0	0.096	0.080	0.075	0.065	0.058	0.045	0.034	0.029

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Rozelle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	83.6	0	0.078	0.044	0.042	0.034	0.027	0.022	0.017	0.013
1996	0.0									
1997	0.0									
1998	72.5	0	0.088	0.056	0.050	0.045	0.040	0.027	0.020	0.015
1999	89.9	0	0.059	0.050	0.047	0.038	0.032	0.025	0.020	0.015
2000	87.8	0	0.080	0.068	0.058	0.048	0.036	0.030	0.026	0.021
2001	93.4	1	**0.115**	0.066	0.057	0.047	0.040	0.032	0.026	0.021
2002	88.1	0	0.100	0.073	0.066	0.053	0.043	0.035	0.028	0.023
2003	91.2	0	0.083	0.064	0.058	0.045	0.037	0.031	0.027	0.023
2004	88.9	0	0.094	0.077	0.072	0.056	0.045	0.034	0.027	0.024

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: St Marys

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	88.2	0	0.068	0.064	0.060	0.055	0.047	0.036	0.028	0.021
1996	94.7	0	0.087	0.067	0.063	0.055	0.048	0.034	0.027	0.021
1997	81.8	**3**	**0.124**	0.095	0.087	0.070	0.059	0.044	0.029	0.023
1998	84.9	**3**	**0.122**	0.097	0.081	0.065	0.056	0.039	0.027	0.023
1999	88.3	**2**	**0.113**	0.091	0.083	0.062	0.052	0.034	0.026	0.021
2000	91.5	**3**	**0.158**	0.096	0.086	0.069	0.058	0.041	0.032	0.027
2001	90.3	**6**	**0.146**	**0.111**	0.099	0.076	0.059	0.042	0.033	0.028
2002	95.3	1	**0.119**	0.091	0.082	0.067	0.059	0.046	0.034	0.028
2003	92.7	0	0.093	0.071	0.066	0.058	0.052	0.037	0.030	0.026
2004	93.6	**3**	**0.142**	0.091	0.082	0.067	0.058	0.044	0.033	0.029

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Woolooware

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	88.7	0	0.098	0.069	0.066	0.048	0.039	0.031	0.025	0.020
1996	95.3	0	0.069	0.056	0.052	0.046	0.038	0.030	0.024	0.021
1997	92.5	**3**	**0.159**	0.087	0.076	0.056	0.046	0.032	0.025	0.021
1998	81.9	1	**0.115**	0.077	0.073	0.056	0.046	0.031	0.024	0.021
1999	73.8	0	0.075	0.059	0.052	0.041	0.037	0.032	0.027	0.022
2000	88.4	0	0.095	0.087	0.071	0.056	0.044	0.032	0.027	0.023
2001	92.7	**2**	**0.126**	0.082	0.063	0.053	0.045	0.035	0.030	0.025
2002	92.3	1	**0.104**	0.074	0.070	0.052	0.041	0.033	0.027	0.023
2003	90.9	1	**0.106**	0.070	0.054	0.045	0.037	0.032	0.028	0.024
2004	60.2	1	**0.108**	0.072	0.062	0.052	0.041	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 59: Statistical summary for O_3 - Annual daily maximum 1-hour average concentration

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	68.7	0	0.069	0.056	0.042	0.037	0.033	0.025	0.021	0.017
1996	88.3	0	0.056	0.041	0.039	0.034	0.031	0.025	0.021	0.018
1997	92.0	1	**0.141**	0.062	0.055	0.048	0.041	0.030	0.025	0.020
1998	94.6	0	0.080	0.065	0.054	0.044	0.040	0.031	0.026	0.021
1999	92.0	0	0.066	0.055	0.051	0.046	0.040	0.033	0.027	0.022
2000	88.4	0	0.071	0.065	0.058	0.048	0.042	0.032	0.027	0.023
2001	93.3	0	0.072	0.063	0.057	0.047	0.040	0.034	0.029	0.025
2002	94.0	0	0.083	0.077	0.061	0.054	0.046	0.037	0.030	0.025
2003	92.4	0	0.079	0.061	0.054	0.045	0.039	0.035	0.030	0.025
2004	92.3	1	**0.112**	0.068	0.065	0.052	0.044	0.036	0.030	0.025

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

Bold font indicates values that exceed the AAQ NEPM standard

Table 60: Statistical summary for O_3 - Annual daily maximum 1-hour average concentration

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	84.4	0	0.052	0.043	0.038	0.034	0.031	0.025	0.019	0.015
1996	91.9	0	0.056	0.045	0.043	0.037	0.033	0.025	0.020	0.015
1997	76.8	1	**0.129**	0.065	0.054	0.048	0.042	0.034	0.027	0.020
1998	86.6	0	0.095	0.072	0.063	0.050	0.041	0.033	0.027	0.022
1999	83.2	0	0.069	0.057	0.054	0.047	0.042	0.033	0.027	0.021
2000	90.4	0	0.073	0.066	0.060	0.048	0.042	0.032	0.027	0.023
2001	87.9	0	0.078	0.070	0.063	0.053	0.046	0.036	0.028	0.023
2002	81.9	0	0.081	0.074	0.069	0.056	0.049	0.038	0.031	0.025
2003	91.6	0	0.077	0.064	0.060	0.049	0.042	0.034	0.029	0.025
2004	88.2	1	**0.103**	0.071	0.065	0.054	0.047	0.037	0.031	0.026

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 concentration

Station: Albion Park

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	94.0	0	0.080	0.058	0.056	0.043	0.037	0.030	0.025	0.019
1996	83.3	0	0.062	0.053	0.052	0.046	0.040	0.030	0.025	0.021
1997	41.0	**5**	**0.144**	**0.115**	**0.111**	0.068	0.056	0.037	0.028	0.025
1998	89.9	**2**	**0.140**	0.099	0.086	0.062	0.050	0.036	0.029	0.026
1999	90.4	0	0.090	0.084	0.067	0.051	0.043	0.034	0.029	0.025
2000	90.0	1	**0.106**	0.086	0.079	0.059	0.045	0.035	0.030	0.026
2001	93.6	0	0.088	0.074	0.065	0.054	0.044	0.037	0.032	0.027
2002	57.6	0	0.094	0.077	0.068	0.048	0.043	0.033	0.027	0.024
2003	92.8	**4**	**0.130**	0.081	0.063	0.044	0.040	0.034	0.030	0.027
2004	93.5	1	**0.112**	0.080	0.062	0.051	0.044	0.035	0.030	0.027

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

Bold font indicates values that exceed the AAQ NEPM standard

Table 62: Statistical summary for O_3 - Annual daily maximum 1-hour average concentrations

Station: Kembla Grange

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	92.7	0	0.089	0.065	0.058	0.044	0.037	0.028	0.024	0.019
1996	95.0	0	0.083	0.056	0.054	0.047	0.039	0.029	0.024	0.020
1997	89.7	**4**	**0.124**	0.095	0.070	0.056	0.047	0.032	0.028	0.023
1998	87.1	**2**	**0.137**	0.098	0.092	0.063	0.050	0.036	0.029	0.025
1999	91.1	1	**0.101**	0.079	0.065	0.051	0.042	0.033	0.028	0.024
2000	93.9	**3**	**0.117**	0.087	0.077	0.056	0.045	0.034	0.029	0.025
2001	82.3	**2**	**0.119**	0.085	0.078	0.056	0.046	0.036	0.030	0.025
2002	91.7	0	0.099	0.084	0.079	0.053	0.044	0.036	0.031	0.026
2003	93.3	**2**	**0.113**	0.092	0.066	0.044	0.038	0.033	0.030	0.026
2004	91.3	**3**	**0.120**	0.077	0.060	0.051	0.043	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 concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	59.7	0	0.097	0.076	0.074	0.052	0.044	0.032	0.026	0.021
1996	94.4	0	0.066	0.060	0.054	0.046	0.037	0.026	0.018	0.013
1997	90.6	**4**	**0.120**	0.094	0.064	0.055	0.047	0.032	0.026	0.023
1998	87.0	1	**0.105**	0.082	0.071	0.060	0.048	0.034	0.027	0.023
1999	87.7	0	0.087	0.067	0.062	0.046	0.041	0.032	0.027	0.021
2000	94.1	1	**0.108**	0.083	0.074	0.061	0.046	0.034	0.028	0.024
2001	94.0	1	**0.116**	0.074	0.071	0.061	0.050	0.037	0.030	0.025
2002	90.7	**2**	**0.121**	0.084	0.081	0.062	0.048	0.036	0.030	0.024
2003	92.8	0	0.097	0.080	0.070	0.046	0.040	0.033	0.029	0.025
2004	92.5	1	**0.103**	0.082	0.069	0.055	0.043	0.034	0.029	0.026

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Bathurst

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	50.4	0	0.063	0.052	0.050	0.048	0.045	0.036	0.032	0.027
2002	34.7	0	0.064	0.063	0.062	0.057	0.052	0.044	0.038	0.032
2003	76.4	0	0.056	0.051	0.049	0.046	0.042	0.036	0.032	0.029
2004	89.9	0	0.092	0.067	0.059	0.054	0.050	0.043	0.034	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

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	94.9	0	0.052	0.049	0.047	0.043	0.038	0.029	0.022	0.015
1996	86.4	0	0.071	0.053	0.050	0.046	0.040	0.030	0.022	0.016
1997	94.8	**2**	**0.100**	0.076	0.064	0.057	0.046	0.033	0.024	0.019
1998	84.9	**3**	**0.097**	0.079	0.069	0.055	0.047	0.035	0.023	0.017
1999	99.3	0	0.077	0.064	0.061	0.054	0.045	0.031	0.024	0.018
2000	95.3	**3**	**0.101**	0.078	0.065	0.054	0.045	0.034	0.026	0.021
2001	97.7	**8**	**0.120**	**0.091**	**0.080**	0.065	0.048	0.036	0.029	0.022
2002	95.7	**6**	**0.107**	**0.083**	0.077	0.061	0.054	0.040	0.031	0.024
2003	94.3	**3**	**0.157**	0.078	0.066	0.056	0.045	0.035	0.028	0.023
2004	41.3	**4**	**0.107**	**0.082**	0.080	0.070	0.061	0.044	0.033	0.026

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	87.3	0	0.066	0.061	0.056	0.049	0.043	0.033	0.025	0.021
1996	82.9	0	0.076	0.060	0.058	0.050	0.045	0.034	0.026	0.021
1997	87.3	**5**	**0.102**	**0.081**	0.074	0.060	0.050	0.040	0.028	0.024
1998	77.6	**9**	**0.089**	**0.085**	**0.083**	0.064	0.056	0.038	0.027	0.023
1999	96.0	**4**	**0.092**	0.078	0.074	0.061	0.049	0.034	0.028	0.023
2000	99.3	**6**	**0.115**	**0.086**	0.076	0.063	0.052	0.037	0.030	0.026
2001	95.4	**12**	**0.128**	**0.098**	**0.086**	0.069	0.054	0.039	0.032	0.026
2002	96.8	**7**	**0.099**	**0.088**	0.078	0.066	0.055	0.041	0.033	0.026
2003	95.3	**5**	**0.133**	**0.082**	0.068	0.057	0.050	0.038	0.031	0.027
2004	95.1	**7**	**0.110**	**0.085**	0.078	0.064	0.053	0.041	0.032	0.028

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 Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995 (1)	92.8	0	0.062	0.051	0.045	0.039	0.033	0.026	0.018	0.012
1996 (1)	81.6	0	0.065	0.056	0.050	0.043	0.037	0.028	0.021	0.014
1997 (1)	90.2	**4**	**0.121**	0.078	0.070	0.058	0.045	0.032	0.022	0.017
1998 (1)	87.8	**5**	**0.119**	**0.082**	0.073	0.056	0.045	0.031	0.023	0.017
1999 (1)	91.0	0	0.077	0.065	0.056	0.050	0.039	0.029	0.023	0.018
2000 (1)	98.7	**2**	**0.095**	0.074	0.066	0.053	0.043	0.031	0.025	0.019
2001 (1)	98.5	**4**	**0.137**	**0.080**	0.076	0.057	0.044	0.032	0.024	0.019
2002 (1)	32.4	1	**0.084**	0.072	0.063	0.052	0.043	0.035	0.027	0.020
2003 (2)	84.2	0	0.077	0.057	0.053	0.041	0.037	0.032	0.026	0.021
2004 (2)	91.2	**4**	**0.086**	0.077	0.065	0.054	0.045	0.035	0.029	0.024

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

Bold font indicates values that exceed the AAQ NEPM standard

(1) Lidcombe station closed 2nd quarter 2002

(2) Chullora station commissioned December 2002

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

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	73.4	0	0.067	0.051	0.049	0.036	0.032	0.024	0.019	0.014
1996	78.3	0	0.078	0.062	0.056	0.046	0.035	0.025	0.019	0.014
1997	73.3	**2**	**0.116**	0.076	0.067	0.048	0.039	0.025	0.020	0.015
1998	97.2	**5**	**0.108**	**0.084**	0.077	0.058	0.046	0.031	0.022	0.016
1999	87.3	1	**0.084**	0.068	0.065	0.054	0.041	0.030	0.023	0.018
2000	97.5	**3**	**0.107**	0.076	0.070	0.059	0.047	0.033	0.027	0.022
2001	99.0	**7**	**0.120**	**0.093**	0.078	0.064	0.048	0.036	0.029	0.023
2002	97.7	**5**	**0.089**	0.078	0.068	0.058	0.048	0.035	0.028	0.023
2003	97.1	**3**	**0.132**	0.073	0.054	0.048	0.040	0.033	0.028	0.022
2004	96.4	**5**	**0.092**	**0.080**	0.071	0.059	0.048	0.037	0.029	0.024

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Oakdale

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	63.1	1	**0.088**	0.062	0.053	0.044	0.038	0.030	0.025	0.022
1997	93.2	**12**	**0.133**	**0.090**	**0.081**	0.068	0.055	0.041	0.030	0.026
1998	56.8	**2**	**0.092**	0.079	0.075	0.061	0.051	0.039	0.032	0.027
1999	93.3	**6**	**0.090**	**0.083**	0.075	0.059	0.050	0.038	0.030	0.027
2000	94.0	**4**	**0.098**	**0.082**	0.072	0.055	0.047	0.037	0.029	0.026
2001	36.2	**8**	**0.105**	**0.096**	**0.093**	**0.084**	0.057	0.042	0.030	0.025
2002	19.3	1	**0.080**	0.079	0.076	0.073	0.068	0.055	0.043	0.035
2003	95.0	**3**	**0.089**	0.072	0.064	0.056	0.048	0.039	0.032	0.028
2004	89.2	**7**	**0.099**	**0.088**	0.077	0.064	0.056	0.044	0.034	0.030

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: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	87.3	0	0.061	0.046	0.044	0.039	0.036	0.029	0.024	0.018
1996	92.9	0	0.075	0.055	0.052	0.047	0.041	0.034	0.027	0.022
1997	76.6	**4**	**0.103**	**0.082**	0.067	0.058	0.051	0.039	0.029	0.025
1998	94.8	**2**	**0.097**	0.074	0.068	0.058	0.050	0.037	0.029	0.024
1999	95.9	1	**0.098**	0.071	0.064	0.053	0.048	0.038	0.031	0.025
2000	93.2	0	0.078	0.065	0.061	0.054	0.046	0.036	0.028	0.024
2001	94.5	**6**	**0.111**	**0.084**	0.074	0.065	0.051	0.039	0.032	0.026
2002	96.3	**4**	**0.112**	**0.080**	0.073	0.062	0.056	0.042	0.032	0.027
2003	89.5	**3**	**0.138**	0.076	0.067	0.055	0.048	0.037	0.029	0.025
2004	93.8	1	**0.088**	0.073	0.067	0.057	0.052	0.042	0.033	0.028

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Rozelle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	86.4	0	0.069	0.039	0.037	0.030	0.024	0.020	0.015	0.011
1996	0.0									
1997	0.0									
1998	75.1	0	0.079	0.046	0.044	0.039	0.034	0.025	0.019	0.014
1999	92.6	0	0.053	0.043	0.039	0.035	0.029	0.023	0.019	0.014
2000	91.5	0	0.073	0.058	0.050	0.042	0.034	0.028	0.024	0.019
2001	97.4	1	**0.083**	0.055	0.050	0.040	0.036	0.030	0.024	0.020
2002	92.1	1	**0.087**	0.061	0.054	0.047	0.040	0.032	0.026	0.021
2003	95.3	0	0.070	0.057	0.052	0.039	0.034	0.030	0.025	0.021
2004	92.9	1	**0.087**	0.071	0.065	0.050	0.041	0.032	0.026	0.022

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: St Marys

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	85.1	0	0.058	0.053	0.052	0.047	0.042	0.033	0.026	0.020
1996	89.9	0	0.080	0.056	0.052	0.049	0.043	0.033	0.026	0.020
1997	78.9	**4**	**0.104**	**0.084**	0.071	0.062	0.053	0.040	0.028	0.022
1998	88.6	**4**	**0.091**	0.080	0.071	0.057	0.049	0.034	0.026	0.021
1999	92.2	**3**	**0.091**	0.073	0.065	0.057	0.046	0.031	0.025	0.019
2000	95.6	**5**	**0.136**	**0.083**	0.076	0.063	0.053	0.038	0.030	0.025
2001	94.2	**11**	**0.125**	**0.092**	**0.085**	0.067	0.051	0.040	0.031	0.027
2002	99.7	**7**	**0.093**	**0.084**	0.070	0.060	0.053	0.042	0.032	0.026
2003	96.8	**2**	**0.091**	0.062	0.059	0.051	0.046	0.035	0.029	0.025
2004	97.8	**4**	**0.128**	0.078	0.067	0.060	0.053	0.041	0.032	0.028

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Woolooware

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	90.5	0	0.073	0.057	0.051	0.042	0.036	0.029	0.024	0.019
1996	97.9	0	0.064	0.048	0.045	0.038	0.033	0.028	0.023	0.019
1997	95.4	**4**	**0.131**	0.071	0.062	0.047	0.041	0.029	0.024	0.020
1998	81.2	**2**	**0.094**	0.067	0.064	0.050	0.040	0.029	0.023	0.019
1999	73.1	0	0.071	0.052	0.045	0.038	0.034	0.030	0.026	0.020
2000	92.3	**2**	**0.083**	0.068	0.064	0.047	0.040	0.030	0.026	0.022
2001	96.8	**2**	**0.096**	0.068	0.057	0.046	0.041	0.033	0.028	0.024
2002	96.5	**2**	**0.088**	0.068	0.056	0.047	0.038	0.031	0.026	0.022
2003	95.0	1	**0.089**	0.063	0.049	0.041	0.035	0.030	0.027	0.023
2004	62.4	1	**0.084**	0.064	0.054	0.048	0.038	0.032	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 74: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentrations

Station: Newcastle

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	70.6	0	0.063	0.052	0.041	0.034	0.030	0.023	0.019	0.015
1996	91.9	0	0.054	0.037	0.035	0.031	0.027	0.023	0.019	0.016
1997	95.4	1	**0.125**	0.056	0.050	0.043	0.037	0.029	0.023	0.018
1998	98.6	0	0.068	0.058	0.049	0.040	0.034	0.029	0.024	0.019
1999	96.0	0	0.065	0.050	0.047	0.042	0.037	0.032	0.026	0.021
2000	92.1	0	0.065	0.059	0.051	0.043	0.038	0.030	0.025	0.021
2001	97.4	0	0.069	0.057	0.051	0.042	0.037	0.032	0.027	0.023
2002	98.2	0	0.077	0.063	0.054	0.050	0.041	0.034	0.028	0.023
2003	96.3	0	0.061	0.052	0.049	0.041	0.038	0.033	0.028	0.024
2004	96.4	0	0.073	0.061	0.059	0.048	0.041	0.034	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 75: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	75.3	0	0.048	0.039	0.036	0.030	0.027	0.022	0.017	0.013
1996	83.1	0	0.053	0.041	0.039	0.033	0.028	0.023	0.019	0.014
1997	76.0	**2**	**0.105**	0.054	0.049	0.044	0.039	0.032	0.026	0.019
1998	90.2	1	**0.084**	0.061	0.052	0.043	0.037	0.030	0.026	0.020
1999	86.7	0	0.059	0.050	0.047	0.042	0.038	0.031	0.024	0.020
2000	94.2	0	0.070	0.059	0.056	0.045	0.038	0.030	0.026	0.022
2001	91.7	0	0.073	0.062	0.056	0.048	0.041	0.033	0.027	0.022
2002	85.6	0	0.074	0.067	0.065	0.052	0.043	0.035	0.029	0.023
2003	95.7	0	0.059	0.057	0.054	0.044	0.039	0.032	0.028	0.024
2004	92.0	0	0.078	0.064	0.057	0.049	0.044	0.035	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 76: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Albion Park

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	96.5	0	0.063	0.049	0.045	0.037	0.033	0.028	0.024	0.018
1996	85.9	0	0.053	0.045	0.042	0.038	0.033	0.028	0.024	0.020
1997	43.3	**5**	**0.124**	**0.099**	**0.087**	0.063	0.049	0.033	0.027	0.024
1998	91.2	**5**	**0.116**	**0.084**	0.065	0.052	0.044	0.033	0.028	0.025
1999	89.4	1	**0.081**	0.070	0.056	0.045	0.038	0.032	0.028	0.024
2000	93.7	**4**	**0.083**	0.080	0.065	0.051	0.041	0.034	0.028	0.025
2001	97.7	1	**0.082**	0.064	0.059	0.049	0.041	0.036	0.031	0.026
2002	60.0	1	**0.083**	0.069	0.065	0.043	0.039	0.031	0.026	0.023
2003	96.8	**4**	**0.111**	0.070	0.058	0.040	0.037	0.033	0.029	0.025
2004	97.5	1	**0.092**	0.073	0.055	0.046	0.040	0.033	0.029	0.026

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

Bold font indicates values that exceed the AAQ NEPM standard

Table 77: Statistical summary for O_3 - Daily maximum rolling 4-hour average concentration

Station: Kembla Grange

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	93.5	0	0.063	0.052	0.046	0.039	0.033	0.027	0.023	0.018
1996	96.0	0	0.062	0.048	0.047	0.039	0.034	0.027	0.023	0.019
1997	92.3	**5**	**0.099**	**0.084**	0.060	0.048	0.042	0.030	0.026	0.022
1998	87.7	**6**	**0.117**	**0.081**	0.074	0.053	0.044	0.033	0.027	0.023
1999	88.9	1	**0.081**	0.067	0.056	0.044	0.037	0.031	0.027	0.023
2000	97.9	**4**	**0.089**	0.077	0.067	0.050	0.039	0.032	0.028	0.024
2001	85.7	**2**	**0.092**	0.071	0.061	0.051	0.042	0.034	0.029	0.024
2002	95.8	1	**0.083**	0.071	0.070	0.046	0.040	0.034	0.029	0.024
2003	97.4	**3**	**0.107**	0.073	0.056	0.041	0.036	0.032	0.028	0.025
2004	95.4	**3**	**0.100**	0.067	0.053	0.047	0.040	0.034	0.030	0.026

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: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	59.8	0	0.070	0.064	0.062	0.046	0.037	0.030	0.025	0.020
1996	92.4	0	0.055	0.046	0.043	0.038	0.032	0.023	0.016	0.011
1997	91.6	**4**	**0.113**	**0.081**	0.062	0.050	0.042	0.030	0.025	0.021
1998	87.3	1	**0.082**	0.076	0.067	0.050	0.042	0.031	0.026	0.022
1999	85.4	0	0.073	0.058	0.054	0.043	0.037	0.030	0.025	0.019
2000	98.2	**3**	**0.086**	0.076	0.067	0.056	0.040	0.031	0.027	0.023
2001	98.0	1	**0.091**	0.068	0.064	0.052	0.044	0.034	0.029	0.024
2002	94.6	**2**	**0.099**	0.076	0.068	0.056	0.043	0.034	0.028	0.023
2003	96.4	1	**0.080**	0.072	0.059	0.042	0.037	0.032	0.028	0.024
2004	96.3	**2**	**0.090**	0.067	0.058	0.050	0.040	0.032	0.028	0.025

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Bathurst

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2001	52.3	0	0.060	0.051	0.049	0.046	0.042	0.035	0.030	0.025
2002	36.1	0	0.062	0.058	0.057	0.054	0.049	0.042	0.037	0.030
2003	79.6	0	0.053	0.049	0.047	0.044	0.040	0.036	0.031	0.028
2004	93.7	0	0.067	0.058	0.055	0.050	0.048	0.041	0.033	0.027

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 (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Blacktown	39.1	0.016	0.012	0.012	0.010	0.008	0.005	0.004	0.002
Bringelly	90.8	0.015	0.008	0.007	0.005	0.004	0.002	0.001	0.000
Chullora (1)									
Macarthur (1)									
Richmond	89.7	0.021	0.011	0.009	0.007	0.005	0.003	0.002	0.001
Woolooware	60.7	0.020	0.013	0.012	0.009	0.007	0.004	0.002	0.001
Central Coast (2)									
Illawarra									
Albion Park	92.9	0.034	0.029	0.026	0.017	0.013	0.006	0.001	0.000
Warrawong	91.4	0.088	0.037	0.029	0.021	0.014	0.006	0.002	0.000
Wollongong	92.8	0.053	0.022	0.018	0.014	0.011	0.006	0.003	0.001
Lower Hunter									
Maitland (3)									
Newcastle (1)									
Wallsend	90.1	0.067	0.039	0.032	0.021	0.016	0.010	0.005	0.002

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

(1) Instrument to be installed in 2005.

(2) Station to be established.

(3) Station to be established. Data reported from Wallsend in the interim.

Table 81: Statistical summary for SO_2 - Daily 24-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Blacktown	40.4	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001
Bringelly	94.8	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
Chullora (1)									
Macarthur (1)									
Richmond	92.9	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000
Woolooware	63.7	0.006	0.003	0.003	0.002	0.002	0.001	0.000	0.000
Central Coast (2)									
Illawarra									
Albion Park	97.0	0.009	0.007	0.006	0.004	0.003	0.001	0.000	0.000
Warrawong	95.4	0.012	0.006	0.006	0.004	0.003	0.001	0.000	0.000
Wollongong	97.3	0.015	0.006	0.005	0.003	0.002	0.001	0.001	0.000
Lower Hunter									
Maitland (3)									
Newcastle (1)									
Wallsend	92.9	0.014	0.007	0.006	0.004	0.003	0.002	0.001	0.001

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

(1) Instrument to be installed in 2005.

(2) Station to be established.

(3) Station to be established. Data reported from Wallsend in the interim.

Trend analysis

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

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Blacktown		0.020	0.018	0.020	0.020	0.015	0.020	0.021	0.016	0.016
Bringelly		0.009	0.012	0.013	0.012	0.018	0.012	0.010	0.017	0.015
Richmond		0.018	0.016	0.012	0.019	0.015	0.012	0.028	0.012	0.021
Woolooware	0.040	0.034	0.026	0.029	0.030	0.034	0.026	0.038	0.022	0.020
Illawarra										
Albion Park	0.038	0.036	0.034	0.055	0.033	0.042	0.034	0.029	0.035	0.034
Warrawong				0.058	0.051	0.110	0.162	0.046	0.063	0.088
Wollongong	0.031	0.019	0.043	0.033	0.041	0.031	0.030	0.039	0.031	0.053
Lower Hunter										
Wallsend	0.059	0.080	0.101	0.063	0.074	0.041	0.049	0.045	0.047	0.067

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Blacktown		0.007	0.010	0.008	0.003	0.004	0.005	0.004	0.004	0.004
Bringelly		0.005	0.003	0.003	0.003	0.004	0.003	0.002	0.002	0.002
Richmond		0.003	0.003	0.007	0.003	0.004	0.010	0.004	0.003	0.003
Woolooware	0.006	0.006	0.005	0.004	0.005	0.005	0.006	0.007	0.004	0.006
Illawarra										
Albion Park	0.012	0.011	0.011	0.014	0.009	0.014	0.013	0.009	0.009	0.009
Warrawong				0.011	0.009	0.010	0.013	0.009	0.012	0.012
Wollongong	0.009	0.007	0.011	0.009	0.006	0.008	0.008	0.008	0.006	0.015
Lower Hunter										
Wallsend	0.020	0.022	0.022	0.016	0.014	0.010	0.013	0.012	0.011	0.014

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

Table 84: Annual average concentrations for SO_2 (ppm)

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Blacktown		0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Bringelly		0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000
Richmond		0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000
Woolooware	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Illawarra										
Albion Park	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Warrawong				0.001	0.001	0.001	0.002	0.001	0.001	0.001
Wollongong	0.003	0.002	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.001
Lower Hunter										
Wallsend	0.002	0.003	0.004	0.003	0.002	0.002	0.002	0.002	0.002	0.002

AAQ NEPM Standard - 0.02 ppm (Annual average)

Table 85: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Blacktown

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	41.3	0	0.020	0.010	0.009	0.008	0.006	0.004	0.003	0.002
1997	82.0	0	0.018	0.015	0.011	0.009	0.007	0.005	0.003	0.002
1998	84.9	0	0.020	0.013	0.011	0.009	0.007	0.004	0.003	0.002
1999	88.8	0	0.020	0.009	0.008	0.007	0.006	0.004	0.003	0.002
2000	85.9	0	0.015	0.011	0.010	0.008	0.006	0.004	0.003	0.002
2001	93.9	0	0.020	0.014	0.012	0.008	0.007	0.005	0.003	0.002
2002	93.2	0	0.021	0.013	0.010	0.008	0.006	0.004	0.003	0.002
2003	91.3	0	0.016	0.012	0.010	0.007	0.005	0.004	0.003	0.002
2004	39.1	0	0.016	0.012	0.012	0.010	0.008	0.005	0.004	0.002

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

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

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	64.2	0	0.009	0.007	0.006	0.005	0.004	0.002	0.001	0.001
1997	92.1	0	0.012	0.008	0.007	0.005	0.004	0.002	0.001	0.001
1998	87.8	0	0.013	0.007	0.006	0.005	0.004	0.002	0.002	0.001
1999	87.8	0	0.012	0.008	0.007	0.005	0.004	0.003	0.002	0.001
2000	90.8	0	0.018	0.007	0.006	0.005	0.004	0.003	0.001	0.001
2001	94.7	0	0.012	0.010	0.008	0.006	0.004	0.003	0.002	0.001
2002	94.6	0	0.010	0.009	0.008	0.006	0.004	0.002	0.001	0.001
2003	93.0	0	0.017	0.006	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

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

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

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	64.8	0	0.018	0.007	0.006	0.005	0.004	0.002	0.002	0.001
1997	86.1	0	0.016	0.009	0.008	0.006	0.005	0.003	0.002	0.001
1998	73.0	0	0.012	0.008	0.006	0.005	0.004	0.003	0.001	0.001
1999	90.3	0	0.019	0.018	0.018	0.007	0.005	0.003	0.002	0.001
2000	85.6	0	0.015	0.009	0.007	0.006	0.004	0.002	0.001	0.001
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	0.008	0.006	0.004	0.003	0.001	0.001
2004	89.7	0	0.021	0.011	0.009	0.007	0.005	0.003	0.002	0.001

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

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

Station: Woolooware

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	90.8	0	0.040	0.015	0.012	0.010	0.009	0.006	0.003	0.002
1996	72.0	0	0.034	0.015	0.012	0.010	0.007	0.005	0.003	0.001
1997	83.2	0	0.026	0.014	0.011	0.009	0.007	0.004	0.003	0.001
1998	89.9	0	0.029	0.012	0.009	0.008	0.005	0.003	0.001	0.000
1999	91.9	0	0.030	0.016	0.011	0.008	0.006	0.003	0.001	0.001
2000	92.8	0	0.034	0.024	0.017	0.011	0.008	0.005	0.003	0.002
2001	92.5	0	0.026	0.018	0.016	0.010	0.007	0.004	0.002	0.001
2002	93.4	0	0.038	0.017	0.013	0.010	0.007	0.004	0.002	0.001
2003	93.2	0	0.022	0.018	0.013	0.010	0.007	0.004	0.002	0.001
2004	60.7	0	0.020	0.013	0.012	0.009	0.007	0.004	0.002	0.001

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

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

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	79.4	0	0.059	0.048	0.041	0.029	0.022	0.014	0.007	0.003
1996	52.5	0	0.080	0.057	0.046	0.035	0.024	0.014	0.008	0.005
1997	70.5	0	0.101	0.068	0.062	0.046	0.033	0.021	0.011	0.006
1998	86.6	0	0.063	0.053	0.039	0.034	0.027	0.018	0.009	0.005
1999	80.4	0	0.074	0.042	0.041	0.033	0.024	0.014	0.009	0.004
2000	92.0	0	0.041	0.031	0.030	0.024	0.019	0.012	0.007	0.003
2001	86.9	0	0.049	0.035	0.030	0.025	0.021	0.013	0.008	0.003
2002	80.2	0	0.045	0.034	0.028	0.024	0.019	0.012	0.007	0.004
2003	90.3	0	0.047	0.032	0.028	0.021	0.016	0.011	0.006	0.003
2004	90.1	0	0.067	0.039	0.032	0.021	0.016	0.010	0.005	0.002

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

Table 90: Statistical summary for SO_2 - Annual daily maximum 1-hour average concentrations

Station: Albion Park

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	74.9	0	0.038	0.035	0.032	0.024	0.017	0.006	0.002	0.001
1996	78.6	0	0.036	0.028	0.025	0.019	0.012	0.004	0.001	0.001
1997	41.2	0	0.034	0.028	0.025	0.020	0.016	0.007	0.001	0.000
1998	87.7	0	0.055	0.027	0.025	0.018	0.012	0.005	0.001	0.000
1999	90.5	0	0.033	0.025	0.024	0.017	0.013	0.005	0.001	0.000
2000	94.2	0	0.042	0.032	0.030	0.024	0.017	0.008	0.001	0.000
2001	93.7	0	0.034	0.027	0.024	0.018	0.013	0.008	0.001	0.000
2002	57.4	0	0.029	0.027	0.026	0.022	0.016	0.006	0.001	0.000
2003	93.7	0	0.035	0.025	0.021	0.015	0.012	0.005	0.001	0.000
2004	92.9	0	0.034	0.029	0.026	0.017	0.013	0.006	0.001	0.000

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Warrawong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	0.0									
1997	0.0									
1998	86.8	0	0.058	0.033	0.030	0.019	0.015	0.006	0.002	0.001
1999	89.2	0	0.051	0.036	0.027	0.019	0.013	0.006	0.002	0.001
2000	90.8	0	0.110	0.068	0.038	0.026	0.020	0.011	0.003	0.000
2001	93.1	0	0.162	0.065	0.055	0.042	0.027	0.012	0.003	0.000
2002	94.0	0	0.046	0.031	0.028	0.023	0.019	0.011	0.004	0.000
2003	93.7	0	0.063	0.048	0.040	0.020	0.016	0.009	0.002	0.000
2004	91.4	0	0.088	0.037	0.029	0.021	0.014	0.006	0.002	0.000

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

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

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	59.8	0	0.031	0.026	0.023	0.018	0.013	0.009	0.006	0.003
1996	35.1	0	0.019	0.019	0.018	0.014	0.011	0.006	0.003	0.002
1997	90.5	0	0.043	0.022	0.018	0.014	0.010	0.007	0.004	0.002
1998	91.3	0	0.033	0.027	0.022	0.017	0.013	0.007	0.004	0.002
1999	91.6	0	0.041	0.018	0.016	0.013	0.011	0.008	0.004	0.002
2000	94.3	0	0.031	0.025	0.021	0.017	0.014	0.009	0.005	0.003
2001	92.6	0	0.030	0.027	0.020	0.016	0.013	0.008	0.004	0.002
2002	91.1	0	0.039	0.030	0.025	0.019	0.015	0.009	0.005	0.002
2003	93.7	0	0.031	0.025	0.022	0.015	0.013	0.008	0.004	0.002
2004	92.8	0	0.053	0.022	0.018	0.014	0.011	0.006	0.003	0.001

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

Bold font indicates values that exceed the AAQ NEPM standard

Table 93: Statistical summary for SO_2 - 24-hour average concentrations

Station: Blacktown

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	42.9	0	0.007	0.005	0.005	0.004	0.002	0.002	0.001	0.001
1997	83.8	0	0.010	0.005	0.004	0.003	0.003	0.002	0.001	0.001
1998	89.9	0	0.008	0.005	0.004	0.003	0.003	0.002	0.001	0.001
1999	95.3	0	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2000	84.2	0	0.004	0.003	0.003	0.003	0.002	0.001	0.001	0.000
2001	98.1	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	0.001
2002	96.4	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2003	95.1	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2004	40.4	0	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001

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

Table 94: Statistical summary for SO_2 - 24-hour average concentrations

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	64.2	0	0.005	0.004	0.004	0.002	0.001	0.001	0.001	0.000
1997	96.2	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000
1998	92.1	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000
1999	94.0	0	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.000
2000	94.8	0	0.004	0.002	0.001	0.001	0.001	0.001	0.000	0.000
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

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

Table 95: Statistical summary for SO_2 - 24-hour average concentrations

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	67.5	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000
1997	89.0	0	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.001
1998	75.1	0	0.007	0.004	0.003	0.002	0.001	0.001	0.001	0.000
1999	95.6	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000
2000	89.3	0	0.004	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2001	88.8	0	0.010	0.002	0.002	0.002	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	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000

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

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

Station: Woolooware

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	92.6	0	0.006	0.004	0.004	0.004	0.003	0.002	0.001	0.001
1996	73.2	0	0.006	0.004	0.004	0.003	0.002	0.002	0.001	0.001
1997	85.2	0	0.005	0.004	0.004	0.003	0.003	0.002	0.001	0.001
1998	96.2	0	0.004	0.003	0.003	0.002	0.001	0.001	0.001	0.000
1999	98.6	0	0.005	0.003	0.002	0.002	0.002	0.001	0.000	0.000
2000	96.7	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	0.000
2001	95.9	0	0.006	0.004	0.003	0.002	0.002	0.001	0.000	0.000
2002	97.0	0	0.007	0.003	0.003	0.002	0.002	0.001	0.000	0.000
2003	98.1	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2004	63.7	0	0.006	0.003	0.003	0.002	0.002	0.001	0.000	0.000

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

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

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	78.4	0	0.020	0.011	0.009	0.006	0.005	0.003	0.001	0.001
1996	54.1	0	0.022	0.012	0.011	0.008	0.006	0.004	0.003	0.002
1997	72.6	0	0.022	0.018	0.015	0.012	0.008	0.004	0.003	0.002
1998	91.0	0	0.016	0.014	0.010	0.008	0.006	0.004	0.002	0.002
1999	86.0	0	0.014	0.011	0.009	0.007	0.005	0.003	0.002	0.001
2000	94.5	0	0.010	0.009	0.007	0.006	0.004	0.003	0.002	0.001
2001	89.6	0	0.013	0.009	0.008	0.006	0.005	0.003	0.002	0.001
2002	82.2	0	0.012	0.007	0.007	0.005	0.004	0.003	0.002	0.001
2003	93.7	0	0.011	0.006	0.005	0.004	0.003	0.002	0.001	0.001
2004	92.9	0	0.014	0.007	0.006	0.004	0.003	0.002	0.001	0.001

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

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

Station: Albion Park

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	0.0									
1997	33.2	0	0.011	0.008	0.007	0.006	0.003	0.001	0.000	0.000
1998	94.0	0	0.014	0.010	0.008	0.004	0.003	0.001	0.000	0.000
1999	98.6	0	0.009	0.008	0.006	0.004	0.003	0.001	0.000	0.000
2000	98.1	0	0.014	0.009	0.008	0.006	0.004	0.002	0.000	0.000
2001	98.1	0	0.013	0.008	0.007	0.005	0.003	0.002	0.000	0.000
2002	60.0	0	0.009	0.008	0.007	0.006	0.004	0.001	0.000	0.000
2003	98.9	0	0.009	0.007	0.005	0.004	0.003	0.001	0.000	0.000
2004	97.0	0	0.009	0.007	0.006	0.004	0.003	0.001	0.000	0.000

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

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

Station: Warrawong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	0.0									
1997	0.0									
1998	92.6	0	0.011	0.007	0.005	0.004	0.003	0.001	0.000	0.000
1999	95.3	0	0.009	0.007	0.005	0.004	0.003	0.001	0.001	0.000
2000	93.7	0	0.010	0.007	0.006	0.004	0.003	0.002	0.000	0.000
2001	97.3	0	0.013	0.010	0.009	0.006	0.005	0.002	0.000	0.000
2002	98.6	0	0.009	0.006	0.006	0.005	0.003	0.002	0.001	0.000
2003	98.4	0	0.012	0.009	0.007	0.004	0.003	0.002	0.000	0.000
2004	95.4	0	0.012	0.006	0.006	0.004	0.003	0.001	0.000	0.000

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

Table 100: Statistical summary for SO_2 - 24-hour average concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (ppm)	Percentiles (ppm)						
				99th	98th	95th	90th	75th	50th	25th
1995	61.9	0	0.009	0.008	0.008	0.007	0.006	0.004	0.002	0.002
1996	35.5	0	0.007	0.007	0.005	0.004	0.003	0.002	0.001	0.001
1997	92.6	0	0.011	0.006	0.005	0.003	0.003	0.002	0.001	0.000
1998	97.3	0	0.009	0.005	0.005	0.004	0.003	0.002	0.001	0.001
1999	98.1	0	0.006	0.005	0.004	0.004	0.003	0.002	0.001	0.001
2000	99.2	0	0.008	0.006	0.005	0.004	0.003	0.002	0.001	0.001
2001	95.9	0	0.008	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2002	95.3	0	0.008	0.006	0.006	0.004	0.003	0.002	0.001	0.000
2003	98.4	0	0.006	0.005	0.004	0.003	0.003	0.001	0.001	0.000
2004	97.3	0	0.015	0.006	0.005	0.003	0.002	0.001	0.001	0.000

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

Particles as PM_{10}

Statistical summary

Table 101: Statistical summary for PM_{10} - 24-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (ppm)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Blacktown	35.8	42.6	41.9	41.5	36.3	33.7	27.6	22.3	17.9
Bringelly	93.4	**60.3**	44.3	40.6	34.4	30.4	24.7	19.1	13.2
Chullora	90.4	**57.5**	48.4	45.6	38.5	33.7	27.4	21.1	16.2
Liverpool	91.8	**60.5**	46.1	44.1	36.2	32.3	27.1	20.6	14.8
Macarthur (1)	14.8	**59.1**	46.8	44.1	39.8	36.9	30.6	21.6	15.7
Oakdale (2)	56.6	41.3	30.0	26.4	23.8	19.2	15.7	10.4	6.6
Richmond	96.2	46.2	39.9	37.6	33.5	29.7	22.6	17.5	12.2
Rozelle	92.6	**51.4**	42.1	39.4	33.1	30.2	24.9	19.3	13.9
Woolooware	64.5	40.8	37.6	33.4	30.4	27.6	21.6	16.9	12.3
Central Coast (3)									
Illawarra									
Albion Park	95.9	**51.5**	42.6	39.6	33.3	29.4	22.2	15.4	10.5
Kembla Grange (2)	57.4	**57.6**	44.2	42.4	36.1	30.1	21.2	14.8	10.4
Wollongong	97.3	48.1	45.4	39.9	36.3	30.4	23.4	17.3	12.2
Lower Hunter									
Beresfield	87.2	**55.7**	47.5	43.1	38.3	33.2	24.7	19.3	13.9
Maitland (4)									
Newcastle (2)	19.4	46.9	46.0	44.6	37.3	33.3	26.6	21.9	17.1
Regional									
Albury	76.8	**55.6**	41.9	41.1	36.9	32.5	18.5	13.1	9.9
Bathurst	88.5	**72.9**	49.9	46.1	37.9	33.3	24.2	15.3	9.7
Dubbo (3)									
Lismore (3)									
Orange (3)									
Tamworth	79.5	**55.7**	42.3	40.1	34.6	31.0	24.6	19.5	15.3
Wagga Wagga	91.0	**105.9**	**69.7**	**68.4**	**60.0**	47.5	32.8	21.3	13.9

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

Bold font indicates values that exceed the AAQ NEPM standard

(1) Station established November 2004. Data reported from Liverpool until station fully operational

(2) Instrument installed 2004.

(3) Station to be established.

(4) Station to be established. Data reported from Beresfield in the interim.

Trend analysis

Table 102: Maximum 24-hour average concentrations for PM_{10} (µg/m^3)

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Blacktown	38.6	39.2	**57.3**	**66.9**	37.5	36.2	**127.1**	**122.0**	**186.8**	42.6
Bringelly	47.0	**92.0**	**68.2**	45.9	33.9	36.5	**99.4**	**120.2**	**274.7**	**60.3**
Chullora									**212.8**	**57.5**
Liverpool	40.0	37.3	**58.7**	45.7	46.0	**64.1**	**61.4**	**127.6**	**282.6**	**60.5**
Macarthur										**59.1**
Oakdale										41.3
Richmond	**53.6**	**85.8**	**71.5**	**55.6**	44.4	43.2	**119.9**	**126.4**	**194.3**	46.2
Rozelle									36.8	**51.4**
Woolooware	**70.6**	**82.0**	**62.7**	42.3	39.0	46.1	**90.7**	**109.5**	**102.5**	40.8
Illawarra										
Albion Park			**61.6**	**63.6**	48.7	**62.5**	**58.7**	**88.3**	**281.0**	**51.5**
Kembla Grange										**57.6**
Wollongong	**61.0**	**69.6**	**64.8**	**56.9**	40.2	**58.1**	**68.2**	**76.7**	**280.5**	48.1
Lower Hunter										
Beresfield	**66.2**	**100.6**	**71.8**	46.1	48.0	**53.6**	**81.0**	**166.4**	**88.0**	**55.7**
Newcastle										46.9
Regional										
Albury							28.8	**81.3**	**921.4**	**55.6**
Bathurst						35.2	35.6	**258.2**	**621.7**	**72.9**
Tamworth						21.1	34.6	**189.8**	**243.3**	**55.7**
Wagga Wagga							**69.8**	**178.2**	**837.0**	**105.9**

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

Bold font indicates values that exceed the AAQ NEPM standard

NOTE:

Detailed trend data will not be provided until 3 full years of data have been collected for the following newly instrumented or commissioned sites – Rozelle, Oakdale, Macarthur, Kembla Grange and Newcastle.

Table 103: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Blacktown

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1995	86.3	0	38.6	37.2	34.3	29.9	26.4	21.1	14.9	11.3
1996	97.3	0	39.2	30.6	30.0	27.2	25.3	19.3	14.7	10.7
1997	74.2	2	**57.3**	44.0	41.7	35.8	31.3	23.6	17.8	13.5
1998	98.1	1	**66.9**	36.3	33.4	30.8	28.3	21.0	16.0	11.4
1999	92.3	0	37.5	29.3	26.4	24.1	22.1	18.3	14.6	11.3
2000	94.8	0	36.2	29.1	27.9	24.2	21.2	18.1	14.4	11.8
2001	92.9	3	**127.1**	43.2	41.7	35.7	32.5	24.8	18.9	13.9
2002	93.4	**11**	**122.0**	**82.4**	**64.5**	42.9	33.6	25.2	18.4	14.6
2003	94.8	4	**186.8**	**52.7**	41.0	34.3	28.9	21.7	17.0	12.7
2004	35.8	0	42.6	41.9	41.5	36.3	33.7	27.6	22.3	17.9

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

Bold font indicates values that exceed the AAQ NEPM standard

Table 104: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Bringelly

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1995	86.8	0	47.0	35.7	33.2	28.4	25.6	19.9	14.9	11.3
1996	89.1	1	**92.0**	33.5	30.8	26.0	24.0	18.8	14.0	9.7
1997	98.4	1	**68.2**	40.2	34.3	31.8	27.6	21.1	15.0	10.9
1998	95.9	0	45.9	37.9	36.3	30.6	28.2	20.2	15.1	10.4
1999	85.5	0	33.9	29.3	27.0	24.3	22.2	18.0	14.2	11.0
2000	88.5	0	36.5	33.0	30.6	26.7	23.1	18.4	14.7	12.1
2001	96.7	5	**99.4**	**54.7**	33.6	27.3	24.4	20.2	16.2	12.6
2002	97.0	**12**	**120.2**	**73.6**	**64.4**	40.1	34.5	25.4	18.4	13.6
2003	97.0	5	**274.7**	**52.1**	40.1	33.9	28.8	21.4	16.6	12.1
2004	93.4	2	**60.3**	44.3	40.6	34.4	30.4	24.7	19.1	13.2

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Lidcombe(1) / Chullora(2)

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1995 (1)	89.0	0	37.3	35.9	34.2	29.8	25.9	19.8	15.4	11.2
1996 (1)	87.4	0	46.2	35.1	31.4	28.7	26.0	20.0	14.9	11.5
1997 (1)	81.1	0	49.8	39.8	36.8	31.8	27.5	21.2	15.9	11.9
1998 (1)	100.0	0	38.7	32.5	30.8	28.1	23.2	17.8	13.1	10.0
1999 (1)	87.7	0	37.0	31.4	29.6	26.0	23.7	20.0	15.6	11.6
2000 (1)	94.3	1	**52.5**	38.5	34.1	29.5	25.4	20.2	16.2	12.4
2001 (1)	86.0	1	**65.3**	39.5	34.5	30.1	27.8	23.1	17.9	14.0
2002 (1)	30.7	3	**86.4**	**62.3**	47.2	35.5	29.7	20.8	16.0	13.9
2003 (2)	85.2	**10**	**212.8**	**59.6**	**55.3**	45.1	35.7	28.5	21.0	16.3
2004 (2)	90.4	2	**57.5**	48.4	45.6	38.5	33.7	27.4	21.1	16.2

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

Bold font indicates values that exceed the AAQ NEPM standard

(1) Lidcombe station closed 2nd quarter 2002

(2) Chullora station commissioned December 2002

Table 106: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1995	93.2	0	40.0	38.8	37.1	33.3	29.4	21.9	16.5	12.0
1996	61.2	0	37.3	34.0	32.9	30.0	26.7	20.7	15.7	11.2
1997	92.6	1	**58.7**	41.4	38.3	35.1	29.8	22.9	16.9	12.3
1998	98.6	0	45.7	40.3	39.2	33.2	29.4	22.5	16.7	11.3
1999	97.3	0	46.0	34.8	32.1	27.9	24.3	20.4	15.9	11.4
2000	94.3	2	**64.1**	41.8	36.9	31.1	26.2	20.6	16.4	12.6
2001	95.3	2	**61.4**	37.0	34.9	30.2	28.1	22.6	18.3	13.3
2002	91.0	**13**	**127.6**	**76.0**	**68.5**	46.1	37.3	27.2	20.2	15.1
2003	90.1	**6**	**282.6**	**57.5**	43.9	37.0	32.5	25.5	19.6	14.8
2004	91.8	1	**60.5**	46.1	44.1	36.2	32.3	27.1	20.6	14.8

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: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1995	97.0	2	**53.6**	45.3	41.6	34.1	29.8	21.9	15.0	11.1
1996	95.9	1	**85.8**	32.3	31.3	26.3	22.9	18.2	13.4	9.8
1997	94.8	4	**71.5**	49.5	42.8	35.2	28.6	21.4	16.3	11.2
1998	74.8	1	**55.6**	40.0	35.2	31.4	26.4	18.5	13.6	9.4
1999	92.1	0	44.4	27.5	25.0	22.4	19.4	17.0	13.2	9.8
2000	95.4	0	43.2	33.1	30.8	25.1	22.9	17.7	13.9	10.9
2001	87.4	4	**119.9**	**58.1**	32.6	27.9	25.3	20.1	16.0	11.8
2002	94.2	**17**	**126.4**	**102.8**	**84.2**	49.1	34.9	24.5	17.1	12.2
2003	96.7	**7**	**194.3**	**66.3**	46.4	34.8	28.6	21.1	15.7	11.3
2004	96.2	0	46.2	39.9	37.6	33.5	29.7	22.6	17.5	12.2

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Woolooware

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1995	75.6	3	**70.6**	39.7	33.9	31.0	25.5	20.7	15.6	11.7
1996	99.7	1	**82.0**	31.6	29.8	26.9	24.4	20.1	14.9	11.2
1997	97.3	2	**62.7**	39.4	34.1	30.2	27.2	21.1	16.6	12.4
1998	94.8	0	42.3	35.0	32.5	29.9	25.0	20.1	15.3	11.4
1999	99.2	0	39.0	30.1	27.4	24.4	22.2	18.0	14.5	11.7
2000	87.4	0	46.1	38.2	32.4	26.4	23.1	18.5	14.8	11.5
2001	97.8	2	**90.7**	37.0	34.7	31.4	26.7	21.1	16.1	12.4
2002	94.8	**6**	**109.5**	**61.7**	46.9	36.7	30.8	23.7	17.8	13.7
2003	95.6	2	**102.5**	43.7	38.7	30.5	27.0	20.3	16.1	12.4
2004	64.5	0	40.8	37.6	33.4	30.4	27.6	21.6	16.9	12.3

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

Bold font indicates values that exceed the AAQ NEPM standard

Table 109: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Albion Park

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1995	0.0									
1996	0.0									
1997	43.8	2	**61.6**	48.5	45.6	39.3	32.6	24.6	15.1	9.8
1998	93.2	5	**63.6**	**56.6**	41.9	33.6	28.9	19.3	12.6	8.0
1999	98.9	0	48.7	36.8	32.6	25.4	22.1	16.3	11.0	7.8
2000	96.4	2	**62.5**	41.3	35.8	29.4	25.1	18.2	12.9	9.6
2001	97.3	1	**58.7**	41.9	38.0	34.5	28.5	20.6	14.9	9.9
2002	59.5	**6**	**88.3**	**65.1**	**53.1**	40.2	34.6	26.1	16.4	10.9
2003	96.2	4	**281.0**	**50.2**	38.8	29.9	25.7	19.0	13.7	9.9
2004	95.9	1	**51.5**	42.6	39.6	33.3	29.4	22.2	15.4	10.5

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: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1995	71.5	4	**61.0**	**53.5**	43.3	37.2	32.9	25.0	19.0	15.0
1996	91.3	3	**69.6**	39.7	36.9	32.5	28.7	22.0	16.8	12.8
1997	95.3	2	**64.8**	46.7	42.7	38.4	33.0	24.4	18.1	12.9
1998	96.4	1	**56.9**	45.4	42.1	34.9	28.7	22.1	16.8	12.7
1999	96.4	0	40.2	35.4	32.5	28.4	25.4	20.2	15.8	12.4
2000	93.4	3	**58.1**	46.1	42.3	34.2	26.9	20.7	15.5	11.6
2001	97.5	4	**68.2**	48.0	42.6	36.7	31.2	22.6	16.5	12.1
2002	94.5	**9**	**76.7**	**61.9**	**53.1**	43.8	34.1	25.6	18.5	13.7
2003	97.8	**7**	**280.5**	**60.4**	46.7	34.3	28.6	21.5	16.7	12.4
2004	97.3	0	48.1	45.4	39.9	36.3	30.4	23.4	17.3	12.2

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Beresfield

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1995	94.8	**9**	**66.2**	**56.9**	**50.8**	43.3	37.1	27.3	18.9	14.0
1996	91.8	**6**	**100.6**	**54.2**	46.7	39.5	35.5	26.6	18.8	13.4
1997	97.8	**6**	**71.8**	**51.1**	48.0	40.8	33.8	24.4	17.3	11.2
1998	99.7	0	46.1	37.5	36.1	33.1	28.8	23.3	17.1	11.9
1999	98.4	0	48.0	37.8	33.8	28.7	26.3	21.0	16.0	11.5
2000	90.4	1	**53.6**	43.1	38.3	33.8	27.1	20.5	16.2	12.8
2001	90.1	3	**81.0**	47.5	45.6	37.4	31.8	25.8	20.0	15.0
2002	82.5	**25**	**166.4**	**84.6**	**70.8**	**56.8**	46.3	33.1	21.2	15.9
2003	91.2	5	**88.0**	**53.5**	44.0	34.3	29.1	22.3	17.4	13.2
2004	87.2	1	**55.7**	47.5	43.1	38.3	33.2	24.7	19.3	13.9

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Albury

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	31.8	0	28.8	26.1	25.3	21.8	20.2	16.8	12.2	9.4
2002	86.6	5	**81.3**	**56.8**	44.4	38.0	31.2	22.9	16.1	12.9
2003	80.8	**28**	**921.4**	**215.0**	**190.8**	**91.3**	48.4	22.7	13.9	9.7
2004	76.8	2	**55.6**	41.9	41.1	36.9	32.5	18.5	13.1	9.9

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: Bathurst

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2000	32.5	0	35.2	33.6	32.4	27.6	22.4	17.7	12.2	8.9
2001	30.1	0	35.6	35.3	35.0	31.3	27.5	22.7	16.5	12.3
2002	91.8	**15**	**258.2**	**83.6**	**68.8**	45.7	35.2	25.0	16.6	12.5
2003	90.4	**12**	**621.7**	**103.4**	**75.0**	34.4	26.8	17.0	12.8	8.8
2004	88.5	4	**72.9**	49.9	46.1	37.9	33.3	24.2	15.3	9.7

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

Bold font indicates values that exceed the AAQ NEPM standard

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

Station: Tamworth

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2000	21.0	0	21.1	20.6	20.4	19.0	18.1	15.0	11.5	8.5
2001	97.3	0	34.6	25.7	24.1	22.6	20.0	16.5	13.0	9.9
2002	99.2	**9**	**189.8**	**66.2**	**51.2**	40.9	33.6	23.4	17.4	13.1
2003	92.9	**7**	**243.3**	**54.5**	48.0	34.3	25.8	19.7	15.0	11.4
2004	79.5	2	**55.7**	42.3	40.1	34.6	31.0	24.6	19.5	15.3

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

Table 115: Statistical summary for PM_{10} - 24-hour average concentrations

Station: Wagga Wagga

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2001	31.2	2	**69.8**	45.4	37.5	31.9	28.7	22.5	16.7	12.4
2002	99.2	**35**	**178.2**	**121.6**	**94.9**	**60.6**	49.3	33.3	24.6	16.9
2003	87.4	**22**	**837.0**	**129.7**	**91.4**	**55.5**	43.0	29.1	19.0	12.5
2004	91.0	**28**	**105.9**	**69.7**	**68.4**	**60.0**	47.5	32.8	21.3	13.9

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

Bold font indicates values that exceed the AAQ NEPM standard

Lead

Trend analysis

Table 116: Annual average concentration for Pb in New South Wales (µg/m^3)

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
CBD	0.25	0.20				0.07	0.04(1)	0.03(1)	0.03(1)	0.02(1)
Rozelle	0.09	0.09	0.10	0.09	0.07	0.07	0.04(1)	0.02(1)	0.02(1)	0.01(1)
Illawarra										
Warrawong							0.02(1)	0.02(1)	0.02(1)	0.02(1)
Lower Hunter										
Wallsend								0.05(1)	0.09	0.02(1)

AAQ NEPM Standard – 0.50 µg/m^3 (Annual average)

(1) Average calculated using some data below the minimum detection limit.

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 using ICP-AES analysis (0.007µg/m^3).

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.

Assessment of progress towards achieving the goal

The air quality management programs and strategies put in place by the NSW Government are directed at protecting ambient air quality. The Ambient Air Quality NEPM goal provides additional impetus for the implementation of these strategies and a useful benchmark against which programs to manage the air environment can be assessed.

Framework for Air Quality Management in the Sydney Greater Metropolitan Region

Action for Air, the NSW Government's Air Quality Management Plan for Sydney, the Lower Hunter and the Illawarra, sets out a program of measures which 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

Motor vehicle emissions are the major source of ozone precursors in the Sydney region, making up 72% of Oxides of Nitrogen (NOx) emissions and 38% of Volatile Organic Compound (VOC) emissions in 2003. In the Greater Metropolitan Region (GMR), motor vehicles are the source of 33% of NOx and 41% of VOC emissions, with industry making a more significant contribution to NOx emissions in the GMR.

a) Stage 1 Vapour Recovery at service stations and bulk terminals in Sydney

Stage 1 Vapour Recovery systems are in place in service stations and bulk terminals across Sydney. These systems collect vapours that would otherwise be released at loading terminals and from underground storage tanks at service stations when they are being filled from road tankers and return them to the road tankers. It is estimated these systems can reduce evaporative emissions associated with filling underground storage tanks by 95%.

b) Low Volatility Petrol

While the Commonwealth Government has introduced the Fuel Quality Standards Act 2000, which provides for national fuel standards to be established as determinations under the Act, the management of petrol volatility has been left to the States because of the need to take account of regional climatic and seasonal factors when setting volatility limits. NSW has amended the Protection of the Environment Operations Clean Air (Motor Vehicle and Motor Vehicle Fuels) Regulation 2002 to limit petrol volatility from the start of the 2004/05 summer.

c) NSW Cleaner Vehicles Action Plan

The traditionally slow turnover of the Australian vehicle fleet has been a limiting factor to the realisation of the air quality benefits from cleaner vehicle technology. To address this, the NSW Government has taken steps to improve the environmental performance of the NSW fleet by introducing the Cleaner Vehicles Action Plan. The Plan is designed to hasten the uptake of vehicles complying with the most advanced emission standards. It includes Clean Car Benchmarks which rate the environmental performance of new motor vehicles, measures to improve the performance of the Government's fleet, a Clean Fleet Program for private fleets and a web based consumer guide on the environmental performance of passenger vehicles. Consideration is also being given to a proposal to restructure vehicle stamp duty to reward environmental performance.

d) Emissions Standards for Light and Heavy Duty Vehicles

In 1999, the Commonwealth Government announced a timetable for the introduction of progressively more stringent emission standards for light and heavy-duty vehicles as Australian Design Rules under

the Motor Vehicles Standards Act 1989. Based on European Standards, from 2003 new model petrol vehicles have been required to meet Euro 2 emissions standards and from 2005, Euro 3 emission standards. For diesel vehicles, Euro 2 applies from 2002/03 for all new diesel vehicles; Euro 3 for all new medium and heavy duty diesel vehicles applies from 2002/03 and Euro 4 for all new diesel vehicles from 2006/07.

e) National Fuel Standards

The effective operation of the more advanced emission control technology required to meet the more stringent emissions standards depends upon the availability of fuel of an appropriate quality. The Commonwealth Government has enacted the Fuel Quality Standards Act 2000 and under this legislation has established environmental standards for petrol and diesel covering a comprehensive range of parameters which effect vehicle emissions performance.

In combination, it is expected that the new vehicle emissions and fuel standards will achieve significant emission reductions. For example in Sydney from 2002 to 2020 emissions of VOCs from the motor vehicles fleet are forecast to fall by 46%, NOx by 67%, CO by 75% and PM_{10} by 40%.

f) Smoky vehicle program

The DEC operates the Smoky Vehicle Program that identifies vehicles that emit visible smoke continuously for more than 10 seconds. In the 2003/04 year 1,545 penalty infringement notices and 2,398 warning letters were issued. The community can also report smoky vehicles, including on the DEC's website. The DEC receives around 500 reports each month from the public.

g) RTA-Clean Fleet Program

The NSW RTA has worked in conjunction with public and private bus and truck fleets to develop maintenance guidelines to reduce excessive emissions from diesel vehicles. The guidelines will form part of a Clean Fleet program for private fleet operators that will focus on maintenance practices for heavy-duty fleets and vehicle purchasing policies for light-duty fleets. These guidelines are now being piloted with a number of NSW fleets. To support this program, the RTA has developed a diesel emissions training course available through TAFE for diesel mechanics and fleet/workshop managers.

h) Greener bus fleets

Alternative fuels can help cut pollution and State Transit now owns and operates over 400 compressed natural gas buses. CNG buses currently emit significantly lower levels of particles than their diesel counterparts. However, relative to diesel vehicles meeting Euro 4 emission standards (which will apply to all new diesel vehicles from 2006/07), the emission difference between CNG buses and diesel buses will be reduced. The Government has recently announced a tender for 505 new buses over 5 years. The tender is open to both diesel and gas vehicle providers, but all options must comply with the more stringent Euro 4 emission standards

Licensed Industry

Industrial emissions are a relatively small proportion of total emissions of NOx and VOCs in the Sydney region, at 18% and 16% respectively. The situation changes somewhat when considering the Greater Metropolitan Region (GMR), with industry responsible for 60% of NOx and 14% VOC emissions. Industry emissions make up a greater proportion of particle emissions, namely 40% for the Sydney region and 72% for the GMR.

Controls on emissions to air from industrial sources are in place under NSW EPA licensing arrangements for scheduled facilities under the Protection of the Environment Operations Act. The Clean Air Plant and Equipment Regulation provides the regulatory framework for this licensing and it specifies never-to-be exceeded concentration limits for air pollutants. A review of the Clean Air Plant and Equipment Regulation has recently been concluded. The proposed changes to the regulation include emission concentration standards for new plant that reflect contemporary technology and mechanisms for improving the emissions performance of older plant. The new regulation, which will

be incorporated as an amendment to the Protection of the Environment Operations (Clean Air) Regulation 2002, is scheduled to commence by 1 September 2005.

In 1999 load based licensing was introduced, which retains licence specific limits but links licence fees to the amount of pollution discharged thus providing a financial incentive for licensees to achieve discharges below the required minimum performance. In the GMR, the load fee for emissions of NOx and VOCs is higher because of the sensitivity of this region and to provide greater incentive to reduce pollution. A recent review of the scheme found that it had not achieved its full potential to reduce air pollution because in some cases air emission fees had been too low to provide an incentive. To address this, air pollution fees increased significantly from 1 July 2004 for major emitters. For the largest private facilities (top 10 emitters), there was a fee increase of approximately 45%.

Small industrial, commercial and domestic sources

Trends in population growth and economic development are expected to increase the significance of small commercial and domestic sources of emissions as a proportion of total emissions, particularly VOCs. These industries are generally service oriented and include the following: surface coating, mobile asphalt plants, service stations, printers and dry cleaners all make up the non-scheduled commercial industry groups.

The domestic sector is also a contributor to VOC emissions. Household sources include petrol lawnmowers, garden tools, solvents and paints and solid wood heaters.

In combination these "area sources" are responsible for 39% of VOC emissions in the GMR. They are also a significant source (42%) of particle emissions in the Sydney region (2003).

a) Cleaner Industries Program

The Cleaner Industries Program is focused on reducing emissions from commercial and other business premises, through partnerships with industries and peak bodies to promote cleaner production to industry members. The Program also involves other Government agencies and local councils, which have a role as industry educators.

Examples of initiatives under the Program with a focus on reducing emissions to air, include:

- Printing industry – production of a guide to reduce use of solvents.
- Furniture industry – environmental information incorporated into industry manual on safety and environment.
- Composites – reducing use of styrene.
- Dry cleaners – reducing emissions of PERC (tetrachloroethylene).

In 2001 the Program was boosted with the allocation of $5 million from the waste fund to conduct the Industry Partnership Program. While the Partnership Program has a focus on waste reduction it encompasses measures to reduce emissions to air. Funded projects that address air pollution include one for the composites industry to develop a model environmental management tool, and another with the Galvanisers Association of Australia to develop an environmental management system and update the industry's code of practice.

b) Clean Air Fund

The Clean Air Fund was established with funding of over $5 million from the NSW Environmental Trust. It focuses on reducing air pollution from light industrial, commercial and domestic activities and includes:

- Local Air Improvement Program – this program has assisted councils in dealing with local sources of air emissions through emission reduction projects. Funding was made available to Councils from 2002-2004 for projects that sought to reduce emissions of oxides of nitrogen, volatile organic compounds or fine particles, concentrating on non-scheduled premises. A total of 21 projects have been funded through the program.

- Stage 2 Vapour Recovery Pilot – stage 2 vapour recovery systems have been trialled at council refuelling depots in the Sydney GMR. Stage 2 vapour recovery systems collect vapours from car petrol tanks during refuelling. The purpose of the trial was to assess the cost effectiveness of Stage 2 vapour recovery in terms of reducing evaporative emissions at service stations. DEC is continuing to evaluate Stage 2 vapour recovery as an option to reduce VOC emissions in the Sydney GMR
- Investigating measures to encourage the early adoption of less polluting small engines in the State by influencing manufacturers and importers to supply cleaner products and influencing consumers to purchase cleaner small engines. Options to be considered include industry agreements and information based options such as promotion, education and emission labelling.
- The development of an Air Quality Toolkit for council staff to assist them in managing emissions from the activities they regulate.
- Woodsmoke Reduction Program – See text on Page 28.

Conclusions

The data presented in this report demonstrate that NSW achieved compliance with the Ambient Air Quality NEPM goals for carbon monoxide, nitrogen dioxide, sulfur dioxide and lead. Levels of these pollutants continue to be well below Ambient Air Quality NEPM standards.

Compliance with Ambient Air Quality NEPM goals for photochemical smog and fine particles was not demonstrated. Bushfires and severe drought conditions experienced throughout NSW during 2004 have at times contributed to elevated ozone and particle pollution events. However, for ozone in particular, anthropogenic emissions are sufficient to generate exceedences of the Ambient Air Quality NEPM standards and meeting the Ambient Air Quality NEPM goal for photochemical oxidants will be a challenge for NSW.

As has been outlined here, the Action for Air outlines a broad range of strategies to manage air quality in the Sydney Metropolitan Region. A review of Action for Air that is currently underway will examine ways in which the current air quality management framework can be improved to more effectively address the problem areas of ozone and particles.

References

EPA 2003, NSW State of the Environment 2003, NSW Environment Protection Authority, Sydney.

Appendix A: Fine particles as $PM_{2.5}$

In May 2003 NEPC announced a variation to the Ambient Air Quality NEPM. The purpose of the Variation was to include in the Ambient Air Quality NEPM, Advisory Reporting Standards (ARS) for particles as $PM_{2.5}$ and protocols for monitoring and reporting $PM_{2.5}$. The standards introduced are 25µg/m^3 for a daily (24-hour) average, and 8µg/m^3 for an annual average.

Below are presented data measuring particles as $PM_{2.5}$ from NSW during 2004. Also included are historical trend data from 1996 onwards (where available).

$PM_{2.5}$ monitoring

The DEC has operated Tapered Element Oscillating Microbalance (TEOM) continuous fine particle monitors sampling $PM_{2.5}$ since 1996. Currently there is no Australian standard method for monitoring $PM_{2.5}$ using TEOM. The advisory reporting standard allows the use of TEOM monitors for $PM_{2.5}$ measurement, although it is stated that values obtained from this method "cannot be used for comparison with the advisory reporting standards until the outcomes of the $PM_{2.5}$ Equivalence Program have been formally included in the Principal Measure." This report only presents data obtained by TEOM monitors. These data are compared to the advisory reporting standard purely for interest.

The advisory reporting standard requires $PM_{2.5}$ monitoring to be conducted at NEPM performance monitoring stations that have been specified for particles as PM_{10}. At present PM_{10} and $PM_{2.5}$ monitoring is performed concurrently at six of the eighteen stations currently specified as NEPM monitoring stations for PM_{10} - Chullora, Liverpool, Richmond, Woolooware, Beresfield and Wollongong. PM_{10} and $PM_{2.5}$ monitoring is also performed at the Earlwood, Wallsend, Warrawong and Westmead stations which are not designated as NEPM monitoring stations for PM_{10}.

Station siting, exposure and population exposure

Figure A1 shows the location of the $PM_{2.5}$ monitoring stations in the Sydney region, the location of monitoring stations in the lower Hunter and Illawarra regions are given in Figures 2 and 3, respectively, of the main section of this report. *Table A2* gives a brief description of the stations where $PM_{2.5}$ monitoring is conducted.

The Beresfield, Chullora, Richmond, Wallsend, Warrawong and Wollongong stations meet all of the Ambient Air Quality NEPM siting and exposure criteria. The Earlwood, Liverpool, Westmead and Woolooware stations do not meet these criteria. Particulars of non-compliance with siting criteria for each of these stations are given below in *Table A1*.

Information about the characteristics of individual monitoring stations and exposed population are given in the NSW Monitoring Plan, available on the DEC website http://www.dec.nsw.gov.au/air/nepm/index.htm.

Table A1: 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.
Westmead	Clear sky angle <120°. Less than 20m from trees.	Trees have grown since establishment of station.
Woolooware	Clear sky angle <120°. Less than 20m from trees.	Trees have grown since establishment of station.

Figure A1: $PM_{2.5}$ monitoring in the Sydney region (AMG co-ordinates)

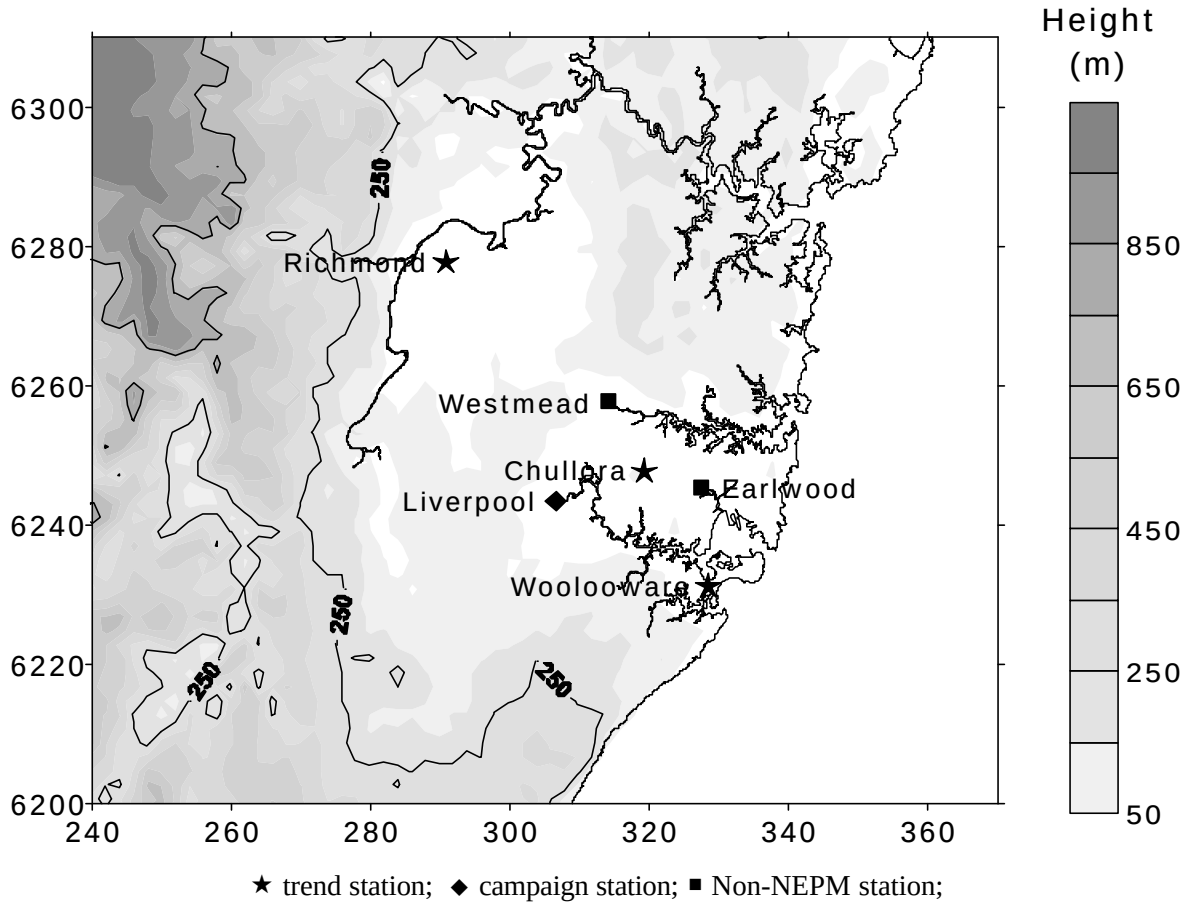

Table A2: Population exposure

Station	Exposed population
Sydney Region	
Chullora	Trend station in a mixed residential and commercial area. Replaced the Lidcombe trend station, which had operated since 1970.
Earlwood	Non-NEPM station in a residential area within the Cooks River valley.
Liverpool	Rural area on the SW edge of the Sydney basin - upper bound station for ozone.
Richmond	Trend station representing the residential area in the north of the Hawkesbury basin.
Westmead	Non-NEPM area in a mixed residential and commercial area at the head of the Parramatta River Valley.
Woolooware	Trend station in a residential area on the south of Botany Bay and within five kilometres of a major industrial complex. Represents coastal conditions south of the CBD, reporting peak levels when precursors are trapped within coastal circulations.
Lower Hunter	
Beresfield	Performance station in a semi-rural area used as a proxy for the Maitland station.
Wallsend	Non-NEPM (for PM_{10}) station in a residential area.
Illawarra	
Warrawong	Non-NEPM (for PM_{10}) station in an industrial-residential area.
Wollongong	Trend station in the main population/commercial centre.

Compliance with reporting standards

The variation to the Ambient Air Quality NEPM (2003) states that values obtained using the TEOM method for $PM_{2.5}$ "cannot be used for comparison with the advisory reporting standards until the outcomes of the $PM_{2.5}$ Equivalence Program have been formally included in the Principal Measure."

This report only presents data obtained by TEOM monitors. These data are compared to the advisory reporting standard for $PM_{2.5}$ purely for interest.

Table A3: Summary of compliance with ARS for $PM_{2.5}$ in New South Wales - 2004

Advisory Reporting Standard
25 µg/m³ (24-hour average)
8 µg/m³ (Annual average)

Region/ Performance monitoring Station	Data availability rates (% of hours)					Number of Exceed-ences (days)	Annual mean (µg/m³)	Performance against the standard	
	Q1	Q2	Q3	Q4	Annual			24-hour	1-year
Sydney									
Chullora	85.7	89.0	92.4	89.1	89.1	0	**8.7**	Met	Not met
Earlwood	95.6	97.8	91.3	100.0	96.2	0	**10.8**	Met	Not met
Liverpool	85.7	92.3	62.0	100.0	85.0	10	**12.5**	Not met	Not met
Richmond	100.0	96.7	100.0	90.2	96.7	2	**9.6**	Not met	Not met
Westmead	100.0	92.3	29.3	00.0	55.2	8	**13.8**	Not met	Not met
Woolooware	92.3	98.9	65.2	00.0	63.9	0	**9.9**	ND	Not met
Illawarra									
Warrawong	100.0	94.5	94.6	87.0	94.0	2	**11.4**	Not met	Not met
Wollongong	98.9	91.2	100.0	98.9	97.3	2	**9.8**	Not met	Not met
Lower Hunter									
Beresfield	95.6	98.9	93.5	72.8	90.2	1	**11.0**	ND	Not met
Wallsend	91.2	63.7	94.6	100.0	87.4	1	**9.9**	ND	Not met

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

All stations above recorded exceedences of the advisory reporting standard annual standards during 2004. Seven stations exceeded the 24-hour advisory reporting standard: Liverpool, Richmond, Westmead, Warrawong, Wollongong, Beresfield and Wallsend. Liverpool recorded ten days that exceeded the 24-hour standard and also recorded the highest annual average of 12.5µg/m³. The closure of the Westmead and Woolooware stations meant that the data availability criteria were not met at these stations, hence the annual averages given for these stations are not truly representative of the annual average.

Data analysis

Table A4: Summary for $PM_{2.5}$ - Daily maximum 24-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Number of valid days	Maximum values (µg/m³)			
			Highest Value	Highest Date	2nd Highest Value	2nd Highest Date
Sydney						
Chullora	89.1	326	24.5	10-Jan	22.1	07-May
Earlwood	96.2	352	24.4	01-Jun	23.3	26-Mar
Liverpool	85.0	311	**41.8**	09-Jan	**39.8**	08-Jun
Richmond	96.7	354	**26.9**	24-May	**26.8**	23-May
Westmead	55.2	202	**36.2**	09-Jan	**31.5**	10-Jan
Woolooware	63.9	234	21.5	16-May	20.8	02-Jun
Illawarra						
Warrawong	94.0	344	**26.8**	10-Jan	**25.8**	26-Mar
Wollongong	97.3	356	**26.7**	10-Jan	**26.2**	21-Feb
Lower Hunter						
Beresfield	90.2	330	**31.7**	08-May	24.0	14-May
Wallsend	87.4	320	**26.9**	08-May	21.9	07-May

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table A5: Days when $PM_{2.5}$ 24-hour Ambient Air Quality NEPM standard exceeded

Date	Stations where standard exceeded	Comments(#)
9-Jan-2004	Liverpool, Westmead	Bushfires (Ku-ring-ai National Park and Wilton)
10-Jan-2004	Liverpool, Westmead, Warrawong, Wollongong	
20-Feb-2004	Liverpool	
21-Feb-2004	Liverpool, Westmead, Wollongong	
26-Mar-2004	Liverpool, Westmead, Warrawong	
7-May-2004	Westmead	
8-May-2004	Beresfield, Wallsend	
16-May-2004	Westmead	Hazard reduction burning
21-May-2004	Liverpool	
23-May-2004	Richmond	Hazard reduction burning
24-May-2004	Richmond	
31-May-2004	Westmead	
2-Jun-2004	Liverpool	
8-Jun-2004	Liverpool, Westmead	
16-Jun-2004	Liverpool	
14-Oct-2004	Liverpool	

The continuing drought conditions across NSW were a major influence on particle levels across the state during 2004. All regions recorded exceedences of the Ambient Air Quality NEPM advisory reporting standard.

The highest recorded daily average was 41.8 µg/m³ at Liverpool on the 9th January. This coincided with two bushfires on the outskirts of Sydney. North of Sydney in Ku-ring-gai National Park over 800ha of bushland was burnt, while south west of Sydney near Wilton over 550ha was burnt.

Table A6: Statistical summary for $PM_{2.5}$ - Daily 24-hour average concentrations (2004)

Region/ Performance monitoring Station	Data availability rates (%)	Maximum conc. (μg/m³)	Percentiles (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Chullora	89.1	24.5	19.4	18.2	16.1	14.2	10.9	7.9	5.8
Earlwood	96.2	24.4	22.2	21.3	18.6	16.5	13.3	10.0	7.5
Liverpool	85.0	**41.8**	**29.2**	**25.8**	20.8	19.3	15.1	11.7	8.5
Richmond	96.7	**26.9**	23.5	20.4	17.5	15.0	11.7	8.9	6.5
Westmead	55.2	**36.2**	**26.6**	**26.2**	23.7	20.0	16.5	12.9	10.0
Woolooware	63.9	21.5	19.7	18.8	16.5	15.4	12.2	9.4	7.0
Illawarra									
Warrawong	94.0	**26.8**	23.6	22.1	20.7	17.9	14.2	10.4	8.0
Wollongong	97.3	**26.7**	21.7	20.6	16.9	15.8	12.2	9.1	6.7
Lower Hunter									
Beresfield	90.2	**31.7**	23.6	23.0	19.9	16.5	12.9	10.3	7.8
Wallsend	87.4	**26.9**	20.1	18.3	16.4	14.3	11.6	9.0	7.3

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Trend data

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

Table A7: Maximum 24-hour average concentrations for $PM_{2.5}$ (µg/m^3)

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Chullora									**81.0**	24.5
Earlwood		22.6	**39.3**	**33.4**	**27.6**	**35.4**	**81.7**	**56.1**	**39.4**	24.4
Liverpool				**26.5**	**25.4**	**45.1**	**118.6**	**89.2**	**50.1**	**41.8**
Richmond		17.2	**51.3**	**40.3**	**33.1**	17.0	**101.3**	**98.2**	**61.9**	**26.9**
Westmead				**29.6**	**25.3**	**31.4**	**91.6**	**59.1**	**67.8**	**36.2**
Woolooware				20.5	23.2	**33.2**	**81.9**	**87.3**	**67.7**	21.5
Illawarra										
Warrawong		**31.7**	**37.1**	**27.0**	19.9	**32.6**	23.2	**85.1**	**160.3**	**26.8**
Wollongong				18.8	19.4	**31.1**	**53.4**	**93.8**	**112.5**	**26.7**
Lower Hunter										
Beresfield				19.2	21.4	**34.1**	**66.4**	**50.4**	**40.9**	**31.7**
Wallsend		14.1	**43.4**	**38.2**	21.9	**61.5**	**56.4**	**59.6**	**34.1**	**26.9**

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table A8: Annual average concentrations for $PM_{2.5}$ (µg/m^3)

Region/ Performance monitoring Station	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sydney										
Chullora									**11.2**	**8.7**
Earlwood		**9.1**	**10.2**	**10.3**	**10.2**	**10.3**	**11.6**	**12.8**	**11.0**	**10.8**
Liverpool				**10.1**	**9.6**	**10.4**	**11.8**	**15.2**	**13.6**	**12.5**
Richmond		6.8	7.9	6.4	6.5	7.0	**10.7**	**11.5**	**10.0**	**9.6**
Westmead				**10.3**	**9.9**	**9.9**	**12.2**	**13.1**	**11.4**	**13.8**
Woolooware				7.9	**8.1**	**9.5**	**11.1**	**11.7**	**10.7**	**9.9**
Illawarra										
Warrawong		7.6	**8.7**	**8.8**	**8.3**	**9.1**	**9.9**	**12.7**	**12.0**	**11.4**
Wollongong				7.7	8.0	**8.3**	**9.4**	**11.5**	**10.5**	**9.8**
Lower Hunter										
Beresfield				**8.2**	**8.8**	**8.8**	**12.4**	**13.6**	**9.4**	**11.0**
Wallsend		7.3	**9.6**	**8.5**	**8.0**	**8.4**	**10.2**	**11.3**	**9.8**	**9.9**

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Statistical trends

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

Station: Earlwood

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1996	10.4	0	22.6	16.0	13.2	12.8	12.4	9.3	7.7	6.6
1997	98.1	**12**	**39.3**	**30.4**	**27.4**	22.1	16.5	12.1	8.8	6.5
1998	95.6	**7**	**33.4**	**25.8**	24.4	19.0	16.9	12.7	9.0	6.9
1999	93.4	**4**	**27.6**	**25.2**	21.1	18.4	16.2	12.7	9.1	6.9
2000	84.7	**3**	**35.4**	21.6	19.9	18.2	16.8	12.1	9.3	7.2
2001	93.7	**8**	**81.7**	**50.2**	**25.1**	20.6	18.1	13.1	9.7	7.6
2002	98.9	**15**	**56.1**	**46.2**	**29.3**	23.6	20.7	15.1	10.9	8.1
2003	98.6	**9**	**39.4**	**30.5**	**26.5**	19.6	17.3	12.9	9.6	7.5
2004	96.2	0	24.4	22.2	21.3	18.6	16.5	13.3	10.0	7.5

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

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

Station: Lidcombe (1) / Chullora (2)

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1996 (1)	13.7	7	**28.3**	**28.0**	**27.9**	**26.8**	**25.5**	16.5	10.3	8.5
1997 (1)	89.3	7	**39.0**	**28.6**	**25.1**	20.1	16.0	12.3	9.1	7.1
1998 (1)	99.7	1	**28.8**	22.4	20.8	17.0	14.3	11.3	8.4	6.2
1999 (1)	98.1	1	**26.2**	21.5	19.6	16.9	14.5	12.0	9.4	7.0
2000 (1)	92.1	2	**45.1**	18.8	18.5	17.0	14.9	11.3	8.9	7.2
2001 (1)	90.4	4	**82.9**	**28.9**	19.9	18.6	16.1	12.7	9.7	7.8
2002 (1)	32.1	4	**70.6**	**48.6**	**33.0**	19.5	15.7	11.4	8.9	7.4
1996 (1)	13.7	7	**28.3**	**28.0**	**27.9**	**26.8**	**25.5**	16.5	10.3	8.5
2003 (2)	70.4	**6**	**81.0**	**32.3**	**25.7**	18.8	16.5	13.0	9.7	7.6
2004 (2)	89.1	0	24.5	19.4	18.2	16.1	14.2	10.9	7.9	5.8

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

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

Station: Liverpool

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1998	85.5	1	**26.5**	22.3	21.2	19.2	17.0	12.8	9.6	6.5
1999	98.6	1	**25.4**	20.1	18.6	17.1	14.8	12.1	9.0	6.8
2000	98.4	**5**	**45.1**	**25.3**	22.7	17.8	15.5	12.2	9.5	7.5
2001	98.1	**6**	**118.6**	**53.0**	21.9	19.4	17.1	13.3	10.2	7.6
2002	97.5	**37**	**89.2**	**44.2**	**39.2**	**28.4**	**25.1**	17.7	12.9	9.3
2003	65.5	**12**	**50.1**	**37.3**	**30.3**	24.6	20.6	16.6	12.2	9.6
2004	85.0	**10**	**41.8**	**29.2**	**25.8**	20.8	19.3	15.1	11.7	8.5

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

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

Station: Richmond

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1996	48.1	0	17.2	14.3	13.1	11.3	10.2	8.0	6.4	4.9
1997	94.8	**7**	**51.3**	**31.6**	24.9	17.2	12.3	8.9	6.6	4.9
1998	95.9	**2**	**40.3**	14.6	13.5	11.9	10.3	8.0	5.8	4.2
1999	96.7	1	**33.1**	15.7	12.8	10.9	10.1	8.2	6.1	4.6
2000	96.7	0	17.0	14.2	13.4	12.0	10.6	8.2	6.3	5.1
2001	66.8	**4**	**101.3**	**66.7**	22.4	16.7	13.7	10.9	8.7	6.4
2002	66.3	**12**	**98.2**	**55.0**	**43.1**	23.6	18.3	13.2	9.6	6.4
2003	95.9	**10**	**61.9**	**38.5**	**28.0**	18.6	14.9	11.0	8.4	6.4
2004	96.7	**2**	**26.9**	23.5	20.4	17.5	15.0	11.7	8.9	6.5

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

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

Station: Westmead

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1998	79.7	1	**29.6**	23.7	21.6	18.5	16.1	12.7	9.5	7.0
1999	89.6	1	**25.3**	19.7	19.0	17.2	14.7	11.7	9.1	7.2
2000	88.3	1	**31.4**	21.4	19.9	17.7	15.2	11.9	9.0	7.2
2001	81.1	**5**	**91.6**	**25.8**	23.7	20.1	17.9	14.3	10.9	8.5
2002	76.2	**8**	**59.1**	**38.0**	**29.9**	22.7	20.4	14.8	11.4	8.8
2003	83.6	**5**	**67.8**	**27.7**	23.5	20.6	17.4	13.1	10.4	7.9
2004	55.2	**8**	**36.2**	**26.6**	**26.2**	23.7	20.0	16.5	12.9	10.0

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table A14: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Wooloowware

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1998	75.6	0	20.5	19.0	17.9	14.6	12.9	9.9	7.2	5.3
1999	98.6	0	23.2	16.5	15.1	13.3	11.7	9.6	7.7	6.0
2000	95.1	**3**	**33.2**	24.5	18.8	16.6	14.3	11.1	8.6	7.3
2001	97.8	**2**	**81.9**	22.5	20.7	18.7	16.5	13.1	9.8	7.8
2002	90.4	**9**	**87.3**	**30.4**	**27.6**	21.2	17.6	13.4	9.8	7.6
2003	75.6	**5**	**67.7**	**28.4**	19.9	17.8	15.8	12.6	9.7	7.6
2004	63.9	0	21.5	19.7	18.8	16.5	15.4	12.2	9.4	7.0

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table A15: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Warrawong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1996	47.3	1	**31.7**	16.6	15.5	13.4	12.1	9.7	6.8	4.8
1997	99.7	**4**	**37.1**	23.5	21.0	16.9	13.8	10.6	7.6	5.8
1998	97.3	1	**27.0**	20.3	19.2	17.0	13.2	10.5	8.1	6.2
1999	97.5	0	19.9	16.2	15.6	14.0	12.6	9.6	7.8	6.2
2000	97.5	**3**	**32.6**	20.7	18.7	15.3	13.3	10.5	8.3	6.7
2001	94.2	0	23.2	21.5	20.6	17.6	15.1	12.0	8.9	6.7
2002	96.7	**17**	**85.1**	**40.3**	**30.5**	24.2	20.5	15.0	10.3	7.7
2003	98.4	**8**	**160.3**	**27.3**	24.9	20.6	17.6	14.1	10.5	8.1
2004	94.0	**2**	**26.8**	23.6	22.1	20.7	17.9	14.2	10.4	8.0

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table A16: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Wollongong

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1998	83.6	0	18.8	16.4	14.8	12.6	11.4	9.1	7.3	5.7
1999	98.6	0	19.4	16.1	14.9	12.5	11.4	9.3	7.5	6.1
2000	100.0	1	**31.1**	18.9	17.2	15.1	12.4	9.6	7.6	6.2
2001	96.7	**2**	**53.4**	20.6	19.3	17.0	14.8	11.0	8.2	6.4
2002	95.9	**17**	**93.8**	**40.2**	**30.1**	24.0	18.4	13.4	9.3	7.1
2003	96.7	**7**	**112.5**	**32.4**	23.6	18.3	15.9	11.9	9.3	7.2
2004	97.3	**2**	**26.7**	21.7	20.6	16.9	15.8	12.2	9.1	6.7

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table A17: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Beresfield

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1998	81.9	0	19.2	16.3	15.6	14.1	12.8	10.1	7.8	5.7
1999	95.9	0	21.4	17.6	17.0	15.7	13.9	10.8	8.1	6.2
2000	85.5	**2**	**34.1**	22.5	19.7	15.4	13.4	10.2	7.8	6.3
2001	69.6	**9**	**66.4**	**33.1**	**25.5**	21.1	18.9	14.8	11.3	8.3
2002	95.1	**25**	**50.4**	**45.1**	**39.5**	**29.1**	21.4	15.6	11.1	8.6
2003	90.7	**5**	**40.9**	**27.5**	22.4	16.6	14.1	10.8	8.2	6.2
2004	90.2	1	**31.7**	23.6	23.0	19.9	16.5	12.9	10.3	7.8

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard

Table A18: Statistical summary for $PM_{2.5}$ - 24-hour average concentrations

Station: Wallsend

Year	Data availability rates (%)	Number of Exceedences (days)	Maximum value (µg/m^3)	Percentiles (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
1996	27.3	0	14.1	13.6	12.9	11.6	11.2	8.7	7.1	5.5
1997	86.8	**3**	**43.4**	23.3	21.5	17.3	14.0	11.4	8.4	6.7
1998	95.6	1	**38.2**	17.5	16.9	15.4	13.6	10.4	7.9	5.8
1999	88.8	0	21.9	15.1	14.0	12.7	11.6	9.5	7.6	5.9
2000	88.5	1	**61.5**	17.4	15.7	14.5	13.1	9.8	7.3	6.1
2001	94.8	**8**	**56.4**	**34.2**	**26.4**	18.1	15.5	11.6	8.6	7.1
2002	85.8	**13**	**59.6**	**37.0**	**31.5**	22.3	17.3	12.9	9.3	7.3
2003	88.5	**3**	**34.1**	24.9	20.8	16.4	14.7	11.7	8.8	7.0
2004	87.4	1	**26.9**	20.1	18.3	16.4	14.3	11.6	9.0	7.3

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

Bold font indicates values that exceed the AAQ NEPM advisory reporting standard