

# **Air Monitoring Report 2003**

## **Compliance with the National Environment Protection (Ambient Air Quality) Measure**

June 2004

**Air Monitoring Report 2003:  
Compliance with the National Environment Protection (Ambient Air Quality) Measure  
June 2004**

Author: Air Monitoring Branch, EPA

*For further information please contact:*

Information Officer  
Environment Protection Authority  
GPO Box 2607  
Adelaide SA 5001

Telephone: (08) 8204 2004

Facsimile: (08) 8204 9393

Free call (country): 1800 623 445

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## Monitoring Summary

Air quality in South Australia is monitored in accordance with a monitoring plan developed under the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM) (NEPC, 1998). This report assesses compliance with this measure.

South Australia's monitoring results for 2003 indicated that:

- where sufficient data were available to compare with the goal of the AAQ NEPM (to achieve by 2008), the goal of AAQ NEPM was met for all pollutants, except for lead at Port Pirie, 1 hour sulfur dioxide at Port Pirie and PM<sub>10</sub> at Netley
- where compliance with the standards and the 2008 goal could not be demonstrated through low data capture, it is expected that compliance would have been achieved except for particles at Port Pirie
- exceedences of the PM<sub>10</sub> standard occurred on numerous occasions throughout the state. Some were caused by wind blown dust.
- in Port Pirie, the annual lead standard was exceeded at one NEPM site. The 1-hour SO<sub>2</sub> standard was exceeded twenty seven times and the 24-hour standard was exceeded on one occasion.
- consistently high data capture rates were achieved in most cases, except where monitoring had commenced during 2003.
- A campaign monitoring station at Port Pirie was developed during 2003 to fulfil commitments in SA's monitoring plan (SA EPA, 2001).
- development of monitoring stations continue in order to meet the monitoring requirements specified in the plan. The stations yet to be developed include:
  - Air NEPM monitoring station to north east of Adelaide (PM<sub>10</sub> and SO<sub>2</sub>).
  - Air NEPM monitoring station in the southern metropolitan area of Adelaide (O<sub>3</sub>, NO<sub>2</sub>, PM<sub>10</sub> and SO<sub>2</sub>).

NOTE: There has been some delay in the planned installation of the above sites. This is due to the PM<sub>2.5</sub> variation and co-location studies, which required use of TEOM monitoring units otherwise planned for north eastern Adelaide and southern metropolitan Adelaide. Participation in the national particle composition and dioxin studies has also had an impact.

- Monitoring for airborne lead in Adelaide ceased in mid 2003 after significant reductions were observed following the introduction of lead free fuel. In accordance with the NEPC Peer Review Committee Technical Paper 'Lead Monitoring' (PRC, 2001), a summary report was produced by the EPA which described trends in lead levels in Adelaide (SA EPA, 2003). This document was used as a basis for cessation of lead monitoring in metropolitan Adelaide.
- The EPA is currently reviewing the scale of its monitoring of SO<sub>2</sub> in the metropolitan airshed. This is because data generated so far has indicated ambient levels are consistently well below the standard. The recommendations will be presented in the form of a publicly available report.

## Current monitoring stations

South Australia's AAQ NEPM air monitoring plan was approved by the NEPC in 2001. Data presented in this report have been produced in accordance with the plan (SA EPA, 2001) which details the stations from which air pollutants are measured.

The AAQ NEPM requires the assessment of carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), sulfur dioxide (SO<sub>2</sub>), lead (Pb) and particles less than 10 micrometres in diameter (PM<sub>10</sub>) (NEPC, 1998).

Figure 1 below describes the monitoring station locations in five monitoring regions for metropolitan Adelaide. Figure 2 describes monitoring sites in the Spencer Gulf region. Monitoring is conducted in all of South Australia's most densely populated regions or where air pollution is of greatest concern—Adelaide, Port Pirie, Port Augusta and Whyalla.

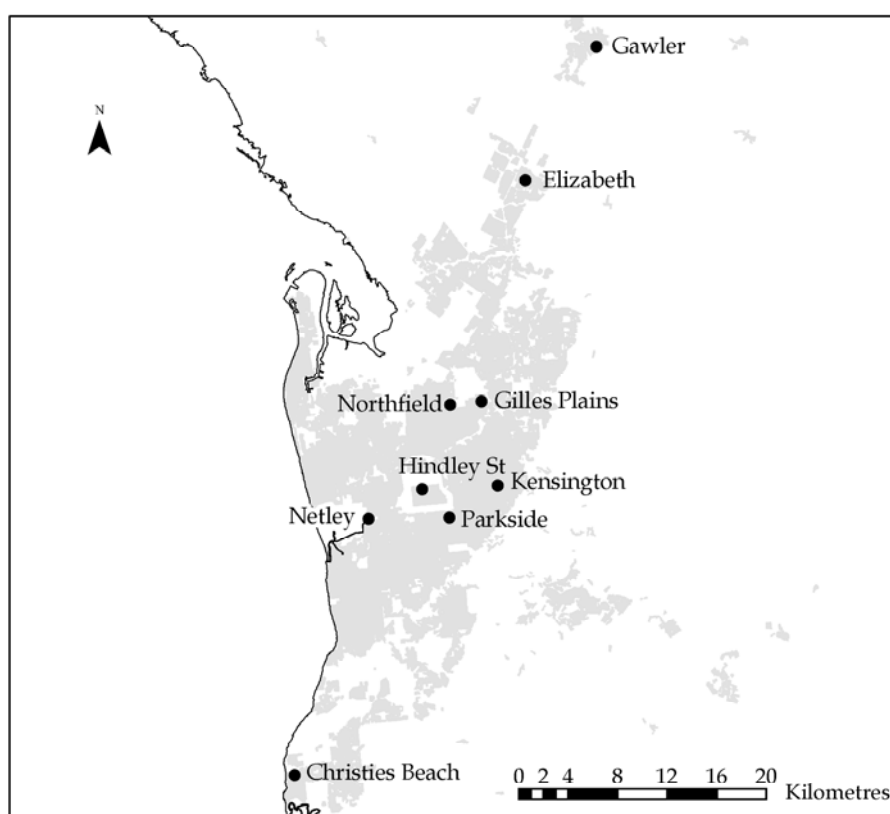


Figure 1 Map of Adelaide region and sites, South Australia



Figure 2 Map of Spencer region and sites, South Australia

The map in Figure 3 below describes the population distribution throughout most of South Australia (including all air monitoring regions) based on the 2001 census (Australian Bureau of Statistics, 2001).

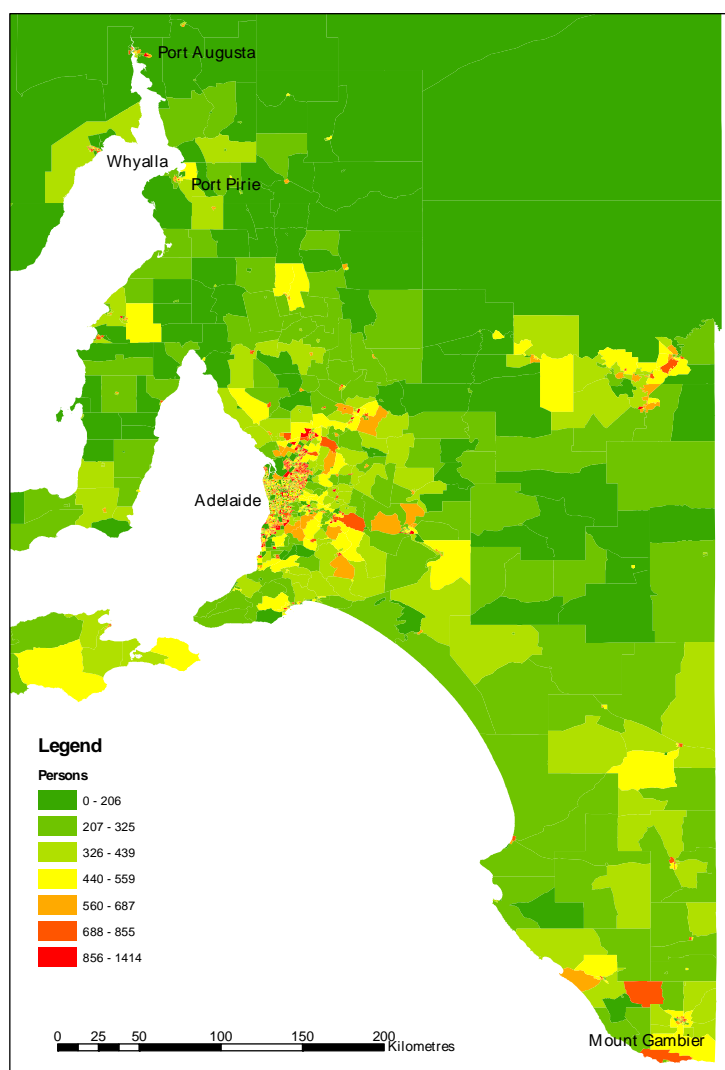


Figure 3 Map of population distribution in South Australia

## Assessment of Compliance with Standards and 2008 Goal

Tables one to six provides information for compliance assessment required under the AAQ NEPM. The AAQ NEPM standards and goals are specified in Schedule 2 of the NEPM. The AAQ NEPM goal is to achieve the standards to the extent specified by 2008 (NEPC, 1998).

Performance is assessed as meeting the standards and 2008 goal if the number of exceedences of the standard is no more than the number specified in Schedule 2 of the AAQ NEPM, and data recovery was at least 75% in each quarter of the year (NEPC, 1998).

If there is not sufficient data collected to demonstrate that the standards and goal have or have not been met, performance is assessed as 'not demonstrated' (NEPC, 2002).

Calculations and reporting methods used comply with requirements detailed in the NEPC Peer Review Committee, Technical Paper No 8: Annual Reports (NEPC, 2002).

### Carbon monoxide

Table 1 2003 compliance summary for CO in South Australia

AAQ NEPM Standard 9.0 ppm (8-hr average)

Region/ performance monitoring station	Data availability rates (% of 8 hour rolling averages)					Number of exceedences (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Hindley Street	59	99	86	96	85	0	ND
Elizabeth	94	94	85	94	92	0	Met

### Nitrogen dioxide

Table 2 2003 compliance summary for NO<sub>2</sub> in South Australia

AAQ NEPM Standard 0.12 ppm (1-hr average), 0.03 ppm (1-yr average)

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	1-year
Gawler	97	98	98	97	97	0	0.003	Met	Met
Elizabeth	97	98	98	94	97	0	0.004	Met	Met
Northfield	94	97	92	98	95	0	0.007	Met	Met
Netley	97	97	98	97	97	0	0.008	Met	Met
Kensington	98	97	98	95	97	0	0.005	Met	Met
*Pt Pirie	91	98	97	84	93	0	0.003	Met	Met

\* Pt Pirie is a regional centre, all other sites are within the Adelaide metropolitan area.

## Ozone

Table 3 2003 compliance summary for O<sub>3</sub> in South Australia

AAQ NEPM Standards 0.10 ppm (1-hr average), 0.08 ppm (4-hr 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	1-hour	4-hour	1-hour	4-hour
Gawler	98	98	98	98	98	0	0	Met	Met
Elizabeth	98	98	98	94	97	0	0	Met	Met
Northfield	98	97	98	98	97	0	0	Met	Met
Netley	97	98	98	97	97	0	0	Met	Met
Kensington	97	98	97	96	97	0	0	Met	Met
*Pt Pirie	98	96	97	98	97	0	0	Met	Met

\* Pt Pirie is a regional centre, all other sites are within the Adelaide metropolitan area.

## Sulfur dioxide

Table 4 2003 compliance summary for SO<sub>2</sub> in South Australia

AAQ NEPM Standards 0.20 ppm (1-hr average), 0.08 ppm (24-hr average), 0.02 ppm (1-yr average)

Region/ performance monitoring station	Data availability rates (% of hours)					Number of exceedences (days)		Annual 1h mean (ppm)	Performance against the standards and goal		
	Q1	Q2	Q3	Q4	Annual	1-hr	24-hr		1-hr	24-hr	1-yr
Christies Beach	68	96	79	92	84	0	0	0.000	ND	ND	ND
Elizabeth	97	98	98	91	96	0	0	0.001	Met	Met	Met
Northfield	96	95	96	95	95	0	0	0.001	Met	Met	Met
Kensington	85	81	89	95	87	0	0	0.002	Met	Met	Met
*Pt Pirie	90	98	97	98	96	21	1	0.008	Not met	Met	Met

\* Pt Pirie is a regional centre, all other sites are within the Adelaide metropolitan area.

The necessity and scale of monitoring for SO<sub>2</sub> within the Adelaide airshed is currently under investigation as sulfur dioxide levels have been consistently well below the standard prescribed in the National Environment Protection (Ambient Air Quality) Measure (NEPC, 1998).

## Particulate matter as PM<sub>10</sub>

Table 5 2003 compliance summary for PM<sub>10</sub> in South Australia

AAQ NEPM Standard 50 µg/m<sup>3</sup> (24-hr average)

Region/ performance monitoring station	Data availability rates (% of days)				Annual	Number of exceedences (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4			
Kensington	77	100	83	96	89	2	Met
Netley	93	100	98	97	97	6	Not Met
Gawler	99	100	98	96	98	3	Met
*Whyalla (Civic Park)	32	30	29	33	31	0	ND
‡Pt Pirie (Oliver Street)	0	3	100	96	50	3	ND

\*Indicates monitoring by high-volume sampler (one in three days). All other sites are measured using TEOM and reported as 'TEOM data' (NEPM PRC, 2001).

Pt Pirie and Whyalla are regional centres, all other sites are located in Adelaide.

‡Pt Pirie TEOM was installed at the end of June 2003

## Lead

Table 6 2003 compliance summary for Lead in South Australia

AAQ NEPM Standard 0.50 µg/m<sup>3</sup> (1-yr average)

Region/performance monitoring station	Data availability rates (% of days)					Annual mean (µg/m <sup>3</sup> )	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
*Pt Pirie Frank Green Park	87	100	100	100	100	0.19	Met
*Pt Pirie Oliver Street	93	100	100	100	97	0.59	Not met

\*Pt Pirie is a regional centre.

As lead levels were consistently well below the standard prescribed in the National Environment Protection (Ambient Air Quality) Measure (NEPC, 1998), monitoring at Northfield, Kensington and Parkside ceased in 2003. Ambient lead concentrations in Adelaide were investigated (Adeeb, F. et al., 2003) and from this, recommendations were made to cease lead monitoring as provided by the PRC Technical Paper No. 9 'Lead Monitoring' (NEPC PRC, 2002).

## Progress Towards Achieving the AAQ NEPM 2008 Goal

As assessed against the National Environment Protection (Ambient Air Quality) Measure (NEPC, 1998), in 2003 the standards and the 2008 goal were met for all pollutants except:

- PM<sub>10</sub> at Netley
- 1h SO<sub>2</sub> at Port Pirie, Oliver Street
- lead at Port Pirie, Oliver Street.

In Adelaide, exceedences of the PM<sub>10</sub> standard occurred on a number of occasions throughout the airshed. This was often associated with dry days, coupled with strong northerly winds.

There were some instances where compliance with the goal could not be demonstrated, shown as 'ND'. For example, compliance of SO<sub>2</sub> at Christies Beach and CO at Hindley Street was assessed as 'not demonstrated'. This was due to insufficient data recovery averaged over the 1st quarter. Some data for PM<sub>10</sub> and CO was likewise classed as 'ND'. The lower data recovery rates were due to a range of causes. This included the stations beginning operation part way through 2003, instrument upgrade or insufficient sampling frequency.

For SO<sub>2</sub>, comparison with other monitoring suggests that the AAQ NEPM 2008 goal was most likely achieved at all stations, despite insufficient data to demonstrate compliance.

### Analysis of extent to which standards and goals are met or not met

On the basis of available data in 2003, the following observations were made:

- For CO, the standard and goal were met at all stations
- For NO<sub>2</sub>, the standard and goal were met at all stations
- For O<sub>3</sub>, the standard and goal were met at all stations
- For SO<sub>2</sub> the 1h standard and goal was not met at Port Pirie. The 24h standard was not met on one occasion at Port Pirie. All other stations met the standard and goal for SO<sub>2</sub>.
- For PM<sub>10</sub> the standard was not met on two occasions at Kensington, on six occasions at Netley and three occasions at Gawler. For the regional centres, the standard was not met on three occasions at Port Pirie. The goal was not met for this reporting period at Netley. For high volume sampler sites at Whyalla (Civic Park) and Port Pirie (Oliver Street), compliance with the standard and goal was not demonstrated.
- For Pb, the annual standard and goal was not met at Port Pirie Oliver Street.

## The future

The EPA in South Australia is undertaking a number of strategies and activities to ensure that the AAQ NEPM standards and 2008 goal are consistently met. Key actions towards this goal include:

- continued improvement of the EPA monitoring network and program to ensure high data capture
- assessment of the laboratory for NATA accreditation in 2004
- continued monitoring in regional areas in accordance with the monitoring plan endorsed by NEPC
- progressing a commitment to improve air quality in regional centres such as Port Pirie through environment improvement programs to achieve greater reduction in lead emissions from the smelter in Port Pirie, as that is the city's major source of airborne lead

## Monitoring Details

### Current performance monitoring stations

The monitoring stations and the pollutants monitored at each are described below in table 7 and reflect the SA EPA's monitoring plan (SA EPA, 2001). They are classed as either peak, campaign or generally representative upper bound sites (GRUB) to indicate how they relate to community exposure. Peak sites characteristically have relatively high concentration ranges but low community exposure. Campaign sites are chosen to fulfil GRUB site characteristics, but as part of a screening program. Campaign sites may only operate for a short period if the pollutant levels do not warrant ongoing measurement.

Table 7 Summary of South Australian current performance monitoring stations

Performance monitoring station	Region (site type)	AAQ NEPM pollutants measured					
		CO	NO <sub>2</sub>	O <sub>3</sub>	SO <sub>2</sub>	Pb	PM <sub>10</sub>
Gawler	Adelaide (campaign)		×	×			×
Elizabeth	Adelaide (GRUB)	×	×	×	×		×
Northfield	Adelaide (GRUB)		×	×	×		×
Netley	Adelaide (GRUB)		×	×			×
Kensington	Adelaide (GRUB)		×	×	×		×
Christies Beach	Adelaide (peak)				×		
Hindley Street	Adelaide (peak)	×					
Pt Pirie, Oliver Street	Spencer (GRUB and campaign)		×	×	×	×	×
Pt Pirie, Frank Green Park	Spencer (GRUB)					×	
Whyalla, Civic Park	Spencer (GRUB)						×

GRUB—generally representative upper bound site

### Implementation of the air monitoring plan

During 2003, the EPA moved closer to fulfilling commitments made in SA's monitoring plan by upgrading monitoring stations and creating new sites. This included:

- upgrading Elizabeth, Netley and Kensington sites
- upgrading campaign monitoring site at Gawler
- upgrading campaign monitoring site at Port Pirie to include a continuous PM<sub>10</sub> monitor
- establishing a campaign monitoring site at Whyalla (O<sub>3</sub>, NO<sub>2</sub> and SO<sub>2</sub>).

Development of monitoring stations continue in order to meet the monitoring requirements specified in the plan. The stations yet to be developed include:

- Air NEPM monitoring station at Hope Valley (PM<sub>10</sub> and SO<sub>2</sub>)
- Air NEPM monitoring station in the southern metropolitan area of Adelaide (O<sub>3</sub>, NO<sub>2</sub>, PM<sub>10</sub> and SO<sub>2</sub>, utilising OPSIS DOAS).

Monitoring for airborne lead in Adelaide was discontinued in mid 2003, due to a significant reduction in airborne lead corresponding with the introduction of lead free fuel. A summary report published in 2003 details trends in lead levels for Adelaide (SA EPA, 2003).

The number of SO<sub>2</sub> monitoring stations is currently being investigated as sulfur dioxide levels have been consistently well below the standard prescribed in the National Environment Protection (Ambient Air Quality) Measure (NEPC, 1998).

## NATA status

All monitoring stations described in this report are operated by the South Australian Environment Protection Authority's Air Monitoring Unit. The unit is currently not NATA accredited, but is moving quickly to this end. The EPA aims for NATA status of the monitoring network and laboratory by the end of 2004.

## Data analysis

Tables presented in this report have been prepared according to the AAQ NEPM guidelines (NEPC PRC, 2002).

## Summary statistics

Annual summary statistics described in tables 8 to 14 below allow assessment of air quality against the standards and the extent of compliance with the goal. The AAQ NEPM states that the short term standards should not be exceeded on more than one day for CO, NO<sub>2</sub>, O<sub>3</sub>, SO<sub>2</sub> and on no more than five days per year for PM<sub>10</sub> (NEPC, 2002). The second highest daily value for the year (or the sixth for PM<sub>10</sub>) indicates the extent to which the standards are or are not met.

## Percentiles and trends

Previous trend analyses have shown that lead concentrations have decreased markedly over the last 10 years, and have now approached the lowest detectable level (Adeeb F. et al., 2003). The EPA will present long term trends for each pollutant in a separate report titled 'Air Quality Monitoring Report—Ambient Air Quality in South Australia Report No 4' (in preparation). A further report describing Australia-wide trends for the years 1991–2001 has been prepared by Environment Australia (Environment Australia, 2004).

## Analysis of Air Quality Monitoring

### Carbon monoxide

Table 8 2003 summary statistics for daily peak 8-hour CO in South Australia

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

Region/ performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Hindley Street	310	6.0	06 Apr 5:00	5.7	09 May 0:00
Elizabeth	334	1.4	24 May 1:00	0.8	09 Jul 1:00

### Nitrogen dioxide

Table 9 2003 summary statistics for daily peak 1-hour NO<sub>2</sub> in South Australia

AAQ NEPM Standard 0.12 ppm (1-hr average)

Region/ performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Gawler	356	0.036	01 Apr 19:00	0.030	28 Jan 21:00
Elizabeth	353	0.043	28 Jan 21:00	0.035	1 Apr 19:00
Northfield	347	0.039	24 Jan 21:00	0.038	8 Dec 21:00
Netley	355	0.039	12 Feb 10:00	0.038	25 Jan 08:00 15 Dec 21:00
Kensington	354	0.040	13 Mar 11:00	0.039	7 Mar 09:00
Pt Pirie	338	0.016	16 May 19:00	0.015	25 Jun 19:00 18 Sep 20:00

## Ozone

Table 10 2003 summary statistics for daily peak 1-hour O<sub>3</sub> in South Australia

AAQ NEPM Standard 0.10 ppm (1-hr average)

Region/ performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2 <sup>nd</sup> highest (ppm)	2 <sup>nd</sup> highest (date:hour)
Gawler	357	0.078	18 Jan 14:00	0.072	14 Feb 17:00
Elizabeth	353	0.077	18 Jan 14:00	0.066	12 Jan 00:00 13 Jan 01:00
Northfield	356	0.068	13 Jan 01:00	0.065	12 Jan 00:00 25 Jan 17:00
Netley	355	0.069	13 Jan 01:00	0.066	25 Jan 17:00
Kensington	354	0.074	20 Dec 15:00	0.071	13 Jan 01:00
Pt. Pirie	354	0.073	6 Jun 02:00	0.068	19 Sep 02:00

Table 11 2003 summary statistics for daily peak 4-hour O<sub>3</sub> in South Australia

AAQ NEPM Standard 0.08 ppm (4-hr average)

Region/ performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2 <sup>nd</sup> highest (ppm)	2 <sup>nd</sup> highest (date:hour)
Gawler	364	0.069	18 Jan 15:00	0.062	20 Dec 16:00
Elizabeth	360	0.063	18 Jan 15:00	0.060	13 Jan 03:00 14 Feb 18:00 20 Dec 15:00
Northfield	363	0.061	13 Jan 03:00	0.057	20 Dec 15:00
Netley	363	0.060	13 Nov 03:00	0.059	25 Jan 17:00
Kensington	361	0.071	20 Dec 16:00	0.064	13 Jan 02:00
Pt Pirie	361	0.048	18 Nov 18:00	0.046	19 Sep 03:00

## Sulfur dioxide

Table 12 2003 summary statistics for daily peak 1-hour SO<sub>2</sub> in South Australia

AAQ NEPM Standard 0.20 ppm (1-hr average)

Region/ performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Christies Beach	306	0.059	07 Feb 14:00	0.054	21 Feb 12:00
Elizabeth	350	0.032	01 Aug 10:00	0.012	09 May 07:00 05 Jul 05:00
Northfield	348	0.009	12 Aug 06:00	0.008	15 Nov 11:00
Kensington	319	0.045	28 Jan 05:00	0.029	01 Feb 13:00
Pt Pirie	349	0.487	04 Sep 10:00	0.478	04 Nov 14:00

Table 13 2003 summary statistics for daily peak 24-hour SO<sub>2</sub> in South Australia

AAQ NEPM Standard 0.08 ppm (24-hr average)

Region/ performance monitoring station	Number of valid days	Highest (ppm)	Highest (date)	2nd highest (ppm)	2nd highest (date)
Christies Beach	305	0.009	13 Apr	0.007	31 May
Elizabeth	359	0.005	05 Jul	0.003	09 May, 09 Jun, 10 Jul, 15 Jul, 27 Jul, 01 Aug, 02 Aug, 07 Aug
Northfield	363	0.003	14 Nov	0.002	06 Jan, 12 Jan, 09 May, 05 Jul, 10 Jul, 27 Jul, 12 Aug, 29 Aug, 01 Oct, 03 Oct, 05 Oct, 12 Oct, 13 Oct, 14 Oct, 16 Oct, 17 Oct, 18 Oct, 22 Oct, 24 Oct, 03 Nov, 04 Nov, 09 Nov, 10 Nov, 11 Nov, 13 Nov, 15 Nov, 17 Nov, 19 Nov, 21 Nov, 24 Nov, 26 Nov, 02 Dec
Kensington	331	0.016	01 Feb	0.011	15 Jan 02 Jun
Pt Pirie	355	0.095	04 Sep	0.051	18 Sep

## Particulate matter as PM<sub>10</sub>

Table 14 2003 summary statistics for 24-hour PM<sub>10</sub> in South Australia

AAQ NEPM Standard 50 µg/m<sup>3</sup> (24-hr average)

Region/ performance monitoring station	Number of valid days	Highest (µg/m <sup>3</sup> )	Highest (date)	6th highest (µg/m <sup>3</sup> )	6th highest (date)
Kensington	324	85.9	11 July	38.8	25 Jan
Netley	354	119.4	11 July	51.7	18 Oct
Gawler	358	51.9	13 Jan	44.7	12 Jan
*Whyalla (Civic Park)	113	47.9	8 Dec	32.6	14 Nov
Pt Pirie Oliver Street*	183	60.5	18 Nov	42.6	9 Dec

\* Monitoring by high-volume sampler (one in six days), otherwise monitoring is by TEOM and reported as 'TEOM data' (NEPM PRC, 2001).

## Data Analysis

This section provides the results of additional analyses, including percentiles of daily peak concentrations.

### Carbon monoxide

Table 15 Percentiles of daily peak 8-hour CO concentrations for 2003

AAQ NEPM Standard 9.0 ppm (8-hr average)

Region/ performance monitoring station	Data availability (% of days)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Hindley Street	85	6.0	5.2	4.8	4.0	3.7	2.8	2.0
Elizabeth	92	1.4	0.8	0.7	0.5	0.4	0.2	0.1

### Nitrogen dioxide

Table 16 Percentiles of daily peak 1-hour NO<sub>2</sub> concentrations for 2003

AAQ NEPM Standard 0.12 ppm (1-hr average)

Region/ performance monitoring station	Data availability rates (%)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Gawler	97	0.036	0.024	0.023	0.021	0.020	0.014	0.008
Elizabeth	97	0.043	0.030	0.028	0.025	0.022	0.019	0.011
Northfield	95	0.039	0.035	0.032	0.031	0.028	0.024	0.017
Netley	97	0.039	0.036	0.035	0.032	0.029	0.026	0.021
Kensington	97	0.040	0.034	0.031	0.026	0.024	0.021	0.014
Pt Pirie	93	0.016	0.014	0.014	0.012	0.011	0.009	0.005

## Ozone

Table 17 Percentiles of daily peak 1-hour O<sub>3</sub> concentrations for 2003

AAQ NEPM Standard 0.10 ppm (1-hr average)

Region/ performance monitoring station	Data availability rates (%)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Gawler	98	0.078	0.066	0.064	0.050	0.042	0.033	0.029
Elizabeth	97	0.077	0.064	0.059	0.050	0.042	0.034	0.029
Northfield	97	0.068	0.060	0.054	0.047	0.042	0.033	0.028
Netley	97	0.069	0.059	0.054	0.045	0.039	0.032	0.027
Kensington	97	0.074	0.065	0.058	0.049	0.042	0.034	0.029
Pt Pirie	97	0.073	0.053	0.048	0.043	0.039	0.033	0.030

Table 18 Percentiles of daily peak 4-hour rolling O<sub>3</sub> concentrations for 2003

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

Region/ performance monitoring station	Data availability rates (%)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Gawler	100	0.069	0.059	0.055	0.046	0.039	0.031	0.028
Elizabeth	99	0.063	0.056	0.052	0.045	0.040	0.032	0.028
Northfield	100	0.061	0.060	0.054	0.047	0.042	0.033	0.028
Netley	99	0.060	0.053	0.047	0.042	0.037	0.030	0.027
Kensington	99	0.071	0.054	0.051	0.045	0.040	0.032	0.028
Pt Pirie	99	0.048	0.044	0.040	0.038	0.035	0.031	0.028

## Sulfur dioxide

Table 19 Percentiles of daily peak 1-hour SO<sub>2</sub> concentrations for 2003

AAQ NEPM Standard 0.20 ppm (1-hr average)

Region/ performance monitoring station	Data availability (% of hours)	Max (ppm)	99th percentile (ppm)	98 <sup>th</sup> percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Christies Beach	84	0.059	0.40	0.026	0.011	0.005	0.002	0.000
Elizabeth	96	0.032	0.009	0.007	0.005	0.003	0.002	0.001
Northfield	95	0.009	0.007	0.006	0.005	0.004	0.002	0.001
Kensington	87	0.045	0.022	0.019	0.014	0.009	0.005	0.003
Pt Pirie	96	0.487	0.388	0.309	0.221	0.152	0.070	0.023

Table 20 Percentiles of 24-hour SO<sub>2</sub> concentrations for 2003

AAQ NEPM Standard 0.08 ppm (24-hr average)

Region/ performance monitoring station	Data availability (% of days)	Max (ppm)	99th percentile (ppm)	98 <sup>th</sup> percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Christies Beach	84	0.009	0.003	0.003	0.002	0.001	0.000	0.000
Elizabeth	98	0.005	0.003	0.003	0.002	0.001	0.001	0.001
Northfield	99	0.003	0.002	0.002	0.002	0.001	0.001	0.000
Kensington	91	0.016	0.010	0.009	0.007	0.005	0.003	0.002
Pt Pirie	97	0.095	0.043	0.037	0.024	0.018	0.011	0.004

## Particulate matter as PM<sub>10</sub>

Table 21 Percentiles of daily 24-hour PM<sub>10</sub> concentrations for 2003

AAQ NEPM Standard 50 µg/m<sup>3</sup> (24-hr average)

Region/ performance monitoring station	Data availability rates (%)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Kensington	89	85.9	44.5	35.2	26.3	21.4	16.7	13.1
Netley	97	119.4	54.0	46.0	33.9	29.4	22.1	17.9
Gawler	98	51.9	49.0	40.1	29.1	24.4	18.3	13.5
*Whyalla (Civic Park)	31	47.9	42.0	38.6	31.5	25.0	17.9	12.5
Pt Pirie Oliver Street*	50	60.5	51.7	47.0	38.9	30.8	21.8	14.1

\* Monitoring by high-volume sampler (one in six days), otherwise monitoring is by TEOM and reported as TEOM data (NEPM PRC, 2001).

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