

# **Air Monitoring Report 2002**

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

September 2003

**Air Monitoring Report 2002:**  
**Compliance with the National Environment Protection (Ambient Air Quality) Measure**  
**September 2003**

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## MONITORING SUMMARY

Air quality in South Australia is monitored in accordance with a monitoring plan developed under the Ambient Air Quality National Environment Protection Measure (AAQ NEPM)<sup>1</sup>. This report assesses compliance with this measure.

South Australia's monitoring results for 2002 indicated that:

- ?? Where sufficient data were available to compare with the goal of the AAQ NEPM (to achieve by 2008 the standards to the extent specified), the goal of AAQ NEPM was met for all pollutants except lead at Port Pirie.
- ?? Although compliance with the standards and the 2008 goal could not be demonstrated at some monitoring stations (particularly for SO<sub>2</sub>) because data capture was low, it is expected that all stations would have complied.
- ?? In Adelaide, an exceedence of the PM<sub>10</sub> standard occurred on 1 day, caused by wind blown dust from agricultural areas. There was one exceedence for SO<sub>2</sub> at Christies Beach, which is situated south of the Port Stanvac oil refinery.
- ?? In Mount Gambier, exceedences of the standard occurred for PM<sub>10</sub> on 2 days in 2002. Exceedences are mostly due to domestic wood burning heaters. EPA investigations of particle pollution sources in Mount Gambier continue.
- ?? In Whyalla an exceedence of the 24-hour PM<sub>10</sub> standard occurred on 1 day in 2002, caused by wind blown dust.<sup>2</sup>
- ?? In Port Pirie, the annual lead standard was exceeded at one site.
- ?? Consistently high data capture rates were achieved in most cases, except where monitoring had commenced during 2002 to fulfil commitments in South Australia's monitoring plan<sup>3</sup>, or where monitoring ceased, such as in Mount Gambier.
- ?? Monitoring stations and instruments were brought into service during 2001-2002 to fulfil commitments in SA's monitoring plan. They include:
  - ?? Air NEPM site at Elizabeth upgraded (O<sub>3</sub>, NO<sub>2</sub>, PM<sub>10</sub>, CO and SO<sub>2</sub>)
  - ?? Air NEPM site at Netley upgraded (O<sub>3</sub>, NO<sub>2</sub>, PM<sub>10</sub> and SO<sub>2</sub>)
  - ?? Air NEPM site at Kensington upgraded (O<sub>3</sub>, NO<sub>2</sub>, PM<sub>10</sub> and SO<sub>2</sub>)
  - ?? Campaign monitoring site upgraded at Gawler (O<sub>3</sub>, NO<sub>2</sub>, PM<sub>10</sub> and SO<sub>2</sub>)
  - ?? Campaign monitoring site developed at Port Pirie (O<sub>3</sub>, NO<sub>2</sub>, PM<sub>10</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>)

<sup>1</sup> National Environmental Protection Measure for Ambient Air Quality, National Environment Protection Council (NEPC), available from [www.ephc.gov.au](http://www.ephc.gov.au)

<sup>2</sup> Data collected by High Volume, one day in six.

<sup>3</sup> Ambient Air Quality Monitoring Plan for South Australia, available from the SA Environment Protection Authority [www.environment.sa.gov.au/epa/pdfs/airnepm.pdf](http://www.environment.sa.gov.au/epa/pdfs/airnepm.pdf)

- ?? 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>)
- ?? Campaign monitoring site at Whyalla (O<sub>3</sub>, NO<sub>2</sub>, PM<sub>10</sub> and SO<sub>2</sub>).
- ?? Monitoring for airborne lead in Adelaide was reduced in mid 2003, due to a significant reduction in airborne lead corresponding with the introduction of lead free fuel. A summary report containing trends in lead levels in Adelaide is available from the South Australian EPA.<sup>4</sup>

## Current Monitoring Performance 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<sup>5</sup> which details the stations from which air pollutants are measured.

The AAQ NEPM requires the monitoring 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>).

Figure 1 below describes the monitoring station's location in five monitoring regions. Figure 2 describes the distribution of the population throughout South Australia. Monitoring is conducted in all of South Australia's most population dense regions or where air pollution is of greatest concern — Adelaide, Mount Gambier, Port Pirie, Port Augusta and Whyalla.

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<sup>4</sup> EPA. 2003. *Future Air Quality Monitoring for Lead in Metropolitan Adelaide*. See [www.environment.sa.gov.au/epa/pdfs/lead\\_aq\\_report.pdf](http://www.environment.sa.gov.au/epa/pdfs/lead_aq_report.pdf)

<sup>5</sup> The report was written in accordance with Peer Review Committee Technical Papers and EPA's development towards NATA accreditation.



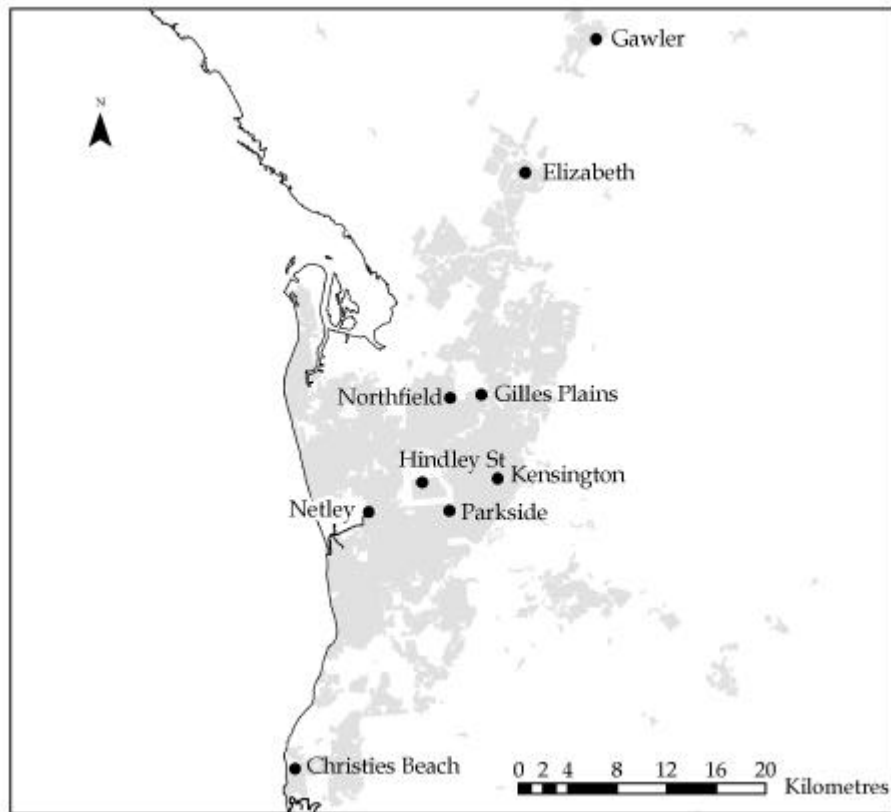


Figure 1 Map of Adelaide region and sites, South Australia



Figure 2 Map of Spencer region and sites, South Australia

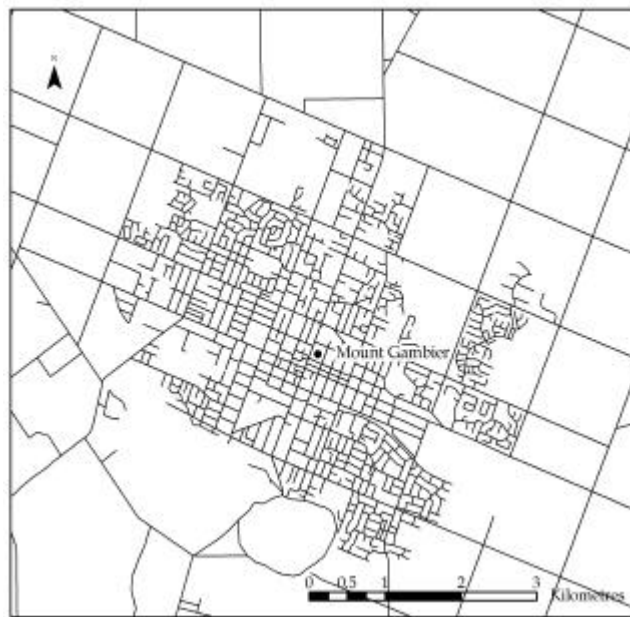


Figure 3 Map of Mount Gambier region and site, South Australia

The map below describes the population distribution throughout most of South Australia (including all air monitoring regions) based on the 2001 Census.<sup>6</sup>

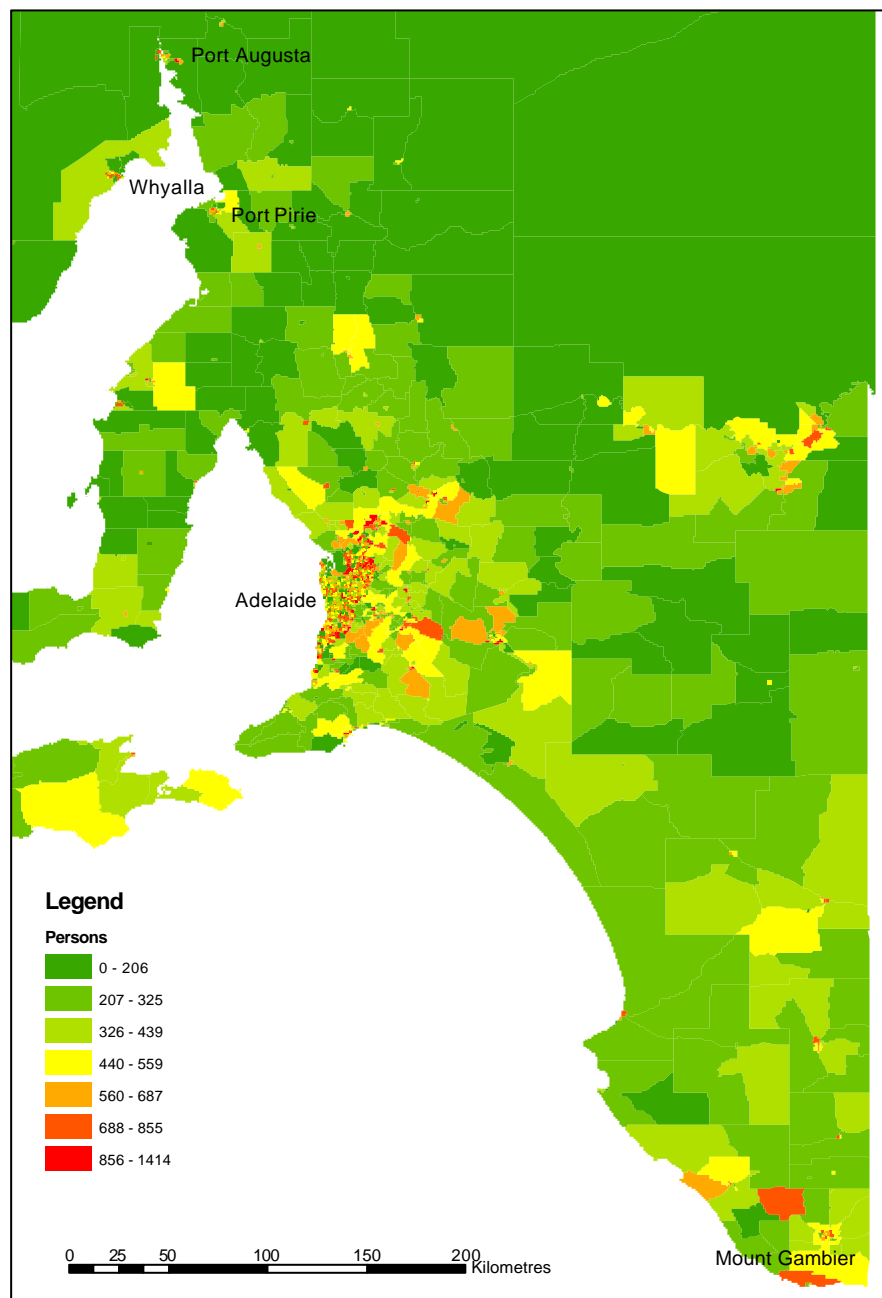


Figure 4 Map of population distribution in South Australia

<sup>6</sup> Australian Bureau of Statistics, 2001 Census, [www.abs.gov.au](http://www.abs.gov.au). Population based on census collection districts.

## Assessment of Compliance with Standards and 2008 Goal

Tables one to six summarise the compliance of monitoring with the AAQ NEPM standards and goal. 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.

If there is insufficient data collected to demonstrate that the standards and goal have or have not been met, performance is assessed as ‘not demonstrated’.

## ASSESSMENT OF COMPLIANCE WITH STANDARDS AND GOALS

The following provides the essential information for the annual compliance assessment required under the AAQ NEPM. The AAQ NEPM standards and goal are specified in Schedule 2 of the NEPM. The AAQ NEPM has a goal to achieve the standards to the extent specified by 2008.

### Carbon monoxide

Table 1 2002 compliance summary for CO in South Australia

AAQ NEPM Standard 9.0 ppm (8-hr average)

Region/ Performance monitoring station	Data availability rates (% of hours)					Number of Exceedences (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Hindley Street	94	92	98	98	96	0	Met
Elizabeth	63	75	96	100	84	0	ND

### Nitrogen dioxide

Table 2 2002 compliance summary for NO<sub>2</sub> in South Australia

AAQ NEPM Standard 1.12 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	80	98	95	94	92	0	0.004	Met	Met
Elizabeth	81	98	98	97	94	0	0.005	Met	Met
Northfield	96	98	99	84	94	0	0.007	Met	Met
Netley	62	89	92	99	86	0	0.009	ND	ND
Kensington	98	98	85	96	94	0	0.005	Met	Met
Mt Gambier*	96	98	68	0	65	0	0.005	ND	ND

\* Mount Gambier is a regional centre, all other sites in Adelaide metropolitan area.

## Ozone

Table 3 2002 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	90	98	99	94	95	0	0	Met	Met
Elizabeth	86	99	99	88	95	0	0	Met	Met
Northfield	98	98	98	95	98	0	0	Met	Met
Netley	95	88	98	98	95	0	0	Met	Met
Kensington	99	89	99	97	96	0	0	Met	Met
Mt Gambier*	100	100	69	0	67	0	0	ND	ND

\* Mount Gambier is a regional centre, all other sites in Adelaide metropolitan area.

## Sulfur dioxide

Table 4 2002 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 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	16	57	82	91	62	1	0	0.002	ND	ND	ND
Elizabeth	0	28	94	67	48	0	0	0.002	ND	ND	ND
Northfield	0	0	0	65	16	0	0	0.002	ND	ND	ND
Kensington	0	0	52	95	37	0	0	0.003	ND	ND	ND
Mt Gambier*	96	86	38	0	47	0	0	0	ND	ND	ND

\* Mount Gambier is a regional centre, all other sites in Adelaide metropolitan area.

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

Table 5 2002 compliance summary for PM<sub>10</sub> in South AustraliaAAQ NEPM Standard 50 µg/m<sup>3</sup> (24-hr average)

Region/ Performance monitoring station	Data availability rates (% of days)					Number of Exceedences (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Kensington	0	9	90	90	48	1	ND
Netley	98	99	99	98	99	1	Met
Gawler	0	14	77	94	47	1	ND
Port Augusta*	93	87	100	87	92	0	Met
Whyalla*	100	100	96	100	99	1	Met
Port Pirie Oliver Street*	93	100	100	93	97	1	Met
Mt Gambier	100	98	70	0	67	2	ND

\*Monitoring by high-volume sampler (one in six days), otherwise monitoring is by TEOM. Performance against the goal has been determined as 'met' at these campaign high-volume sampler sites, in accordance with the South Australian air monitoring plan, which allows for sampling once every six days<sup>7</sup>.

Mount Gambier, Port Pirie and Port Augusta and Whyalla are regional centres, all other sites in Adelaide.

<sup>7</sup> Ambient Air Quality Monitoring Plan for South Australia, available from the SA Environment Protection Authority [www.environment.sa.gov.au/epa/pdfs/airnepm.pdf](http://www.environment.sa.gov.au/epa/pdfs/airnepm.pdf) pp 41-42.

## Lead

Table 6 2002 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		
Gilles Plains	87	93	100	40	80	0.02	ND
Northfield	93	100	81	100	93	0.00	Met
Kensington	93	93	100	100	97	0.00	Met
Parkside	87	100	100	100	97	0.01	Met
Port Pirie Frank Green Park*	100	100	100	100	100	0.21	Met
Port Pirie Oliver Street*	100	100	100	100	100	0.47	Met
Port Pirie West Primary School*	100	100	100	100	100	0.74	Not Met

\*Port Pirie sites are a regional centre, all other sites in Adelaide metropolitan area.

Monitoring at Gilles Plains ceased in 2002 for site upgrades; lead levels were consistently well below the standard.



## Progress towards achieving the AAQ NEPM 2008 Goal

As assessed in accordance with the monitoring protocol, in 2002 the standards and the 2008 goal were met for all pollutants except lead at Port Pirie West Primary School.

Exceedences of the standards occurred for PM<sub>10</sub> and SO<sub>2</sub>. In Adelaide, PM<sub>10</sub> exceedences at three stations occurred on one day, 11 July, due to wind blown dust exacerbated by dry weather and strong northerly winds.

The exceedence of SO<sub>2</sub> standard at Christies Beach was due to a breakdown at the Port Stanvac oil refinery.

There were some instances where compliance with the goal could not be demonstrated, shown as 'ND'. For example, compliance of SO<sub>2</sub> was assessed at all stations as 'not demonstrated' due to insufficient data recovery averaged over the entire year. Some data for PM<sub>10</sub> was likewise classed as 'ND'. The lower data recovery rates were due to the stations beginning operation for each of these pollutants part way through 2002 or instruments were being upgraded. At Mount Gambier, monitoring ceased during the 3<sup>rd</sup> quarter.

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 are, or are not, met

On the basis of available data in 2002, the following observations were made:

- ?? For CO, no exceedences were recorded and compliance was demonstrated at one station
- ?? For NO<sub>2</sub>, no exceedences were recorded and compliance was demonstrated at four stations
- ?? For O<sub>3</sub>, no exceedences were recorded and compliance was demonstrated at five stations
- ?? For SO<sub>2</sub> one exceedence was recorded for Christies Beach – a peak site. There was inadequate data capture for the year from all 5 stations
- ?? For PM<sub>10</sub> there was one exceedence in Adelaide and one exceedence at Whyalla and Port Pirie and two exceedences at Mount Gambier. At Mount Gambier, exceedences in the winter are due to wood smoke from domestic wood heaters and industrial sources. All other exceedences were due to wind blown dust.
- ?? For Pb, compliance was demonstrated at all stations except for Port Pirie West Primary School. The smelter is the source of airborne lead.

## 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:

- ?? EPA monitoring network and laboratory NATA accreditation and continued improvement of the monitoring program to ensure high data capture
- ?? Continue monitoring in regional areas in accordance with the monitoring plan endorsed by NEPC
- ?? Progressing commitment to improve air quality in regional centres by:




































- ?? Using an Environment Improvement Programme to achieve greater reduction in lead emissions from the lead smelter in Port Pirie, as that is the city's major source of airborne lead, and
- ?? Continuing programs to reduce particle emissions in Mt Gambier from domestic wood heaters and timber processing industries in the airshed.

## MONITORING DETAILS

### Current performance monitoring stations

The monitoring stations and the pollutants monitored at each are described below in table 7. They are classed as either peak, campaign or generally representative upper bound sites to indicate how they relate to community exposure. Peak sites represent the highest part of the concentration range, but a relatively small proportion of the community is exposed to those levels. Campaign sites are chosen to fulfil Grub site characteristics, but as part of a screening program, may only operate for the single campaign 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)						
Parkside	Adelaide (Peak)						
Gilles Plains	Adelaide (Peak)						
Mt Gambier	South East (Campaign)						
Port Augusta	Spencer (Campaign)						
Port Pirie Oliver Street	Spencer (Grub)						
Port Pirie West Primary School	Spencer (Peak)						
Port Pirie Frank Green Park	Spencer (Grub)						
Whyalla Civic Park	Spencer (Grub)						

Grub – Generally Representative Upper Bound site

## Implementation of the air monitoring plan

During 2001 and 2002 the EPA either upgraded monitoring stations and instruments or created new sites to fulfil commitments in SA's monitoring plan. They include:

- ?? Air NEPM site at Elizabeth, Netley and Kensington upgraded
- ?? Campaign monitoring site upgraded at Gawler
- ?? Campaign monitoring site developed at Port Pirie (commissioned in last quarter of 2002 and includes O<sub>3</sub>, NO<sub>2</sub> and SO<sub>2</sub>). Much of the data was invalid and has not been included in this report
- ?? Campaign monitoring at Mount Gambier completed and complemented with two hotspot monitoring sites near industry.

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>, utilising OPSIS DOAS)<sup>8</sup>
- ?? 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)
- ?? Campaign monitoring site at Whyalla (O<sub>3</sub>, NO<sub>2</sub>, PM<sub>10</sub> and SO<sub>2</sub>).

Monitoring for airborne lead in Adelaide was reduced in mid 2003, due to a significant reduction in airborne lead corresponding with the introduction of lead free fuel. A summary report containing trends in lead levels in Adelaide is available from the EPA.<sup>9</sup>

## 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 2003.

## Data analysis

Tables presented in this report have been prepared according to the AAQ NEPM guidelines.<sup>10</sup>

## Summary statistics

Annual summary statistics described in tables 7 to 13 below allow assessment of how close air quality was to 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 5 days per year for PM<sub>10</sub>. The second highest daily value for the year (or the 6<sup>th</sup> for PM<sub>10</sub>) indicates the extent to which the standards are, or not, met. Concentrations exceeding the standard are highlighted in bold.

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<sup>8</sup> OPSIS DOAS – Differential Optical Absorption Spectrometry method.

<sup>9</sup> EPA. 2003. Future *Air Quality Monitoring for Lead in Metropolitan Adelaide*. See [www.environment.sa.gov.au/epa/pdfs/lead\\_aq\\_report.pdf](http://www.environment.sa.gov.au/epa/pdfs/lead_aq_report.pdf)

<sup>10</sup> National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 8, "Annual Reports", available from [www.ephc.gov.au](http://www.ephc.gov.au)

### Percentiles and trends

Previous trend analyses have shown that lead concentrations have decreased markedly over the last 10 years, and have now approached the detectable level. The EPA has presented the longer term trends of each pollutant from each station in a separate report.<sup>11</sup> Australia-wide trends, including data to the end of 2001 from South Australia is currently being prepared by Environment Australia, *Ambient Air Quality: Status and Trends in Australia* (in preparation).

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<sup>11</sup> Environment Protection Authority. 2003. Air Quality Monitoring Report: Annual Report No.4 – Ambient Air Quality in South Australia. Environment Protection Authority, Adelaide, available from [www.environment.sa.gov.au/epa/pdfs/airnepm.pdf](http://www.environment.sa.gov.au/epa/pdfs/airnepm.pdf)

## ANALYSIS OF AIR QUALITY MONITORING

### Carbon monoxide

Table 8 2002 summary statistics for daily peak 8-hour CO in South Australia

AAQ NEPM Standard 9.0 ppm (8-hr average)

<b>Region/ Performance monitoring station</b>	<b>Number of valid days</b>	<b>Highest (ppm)</b>	<b>Highest (date:hour)</b>	<b>2<sup>nd</sup> Highest (ppm)</b>	<b>2<sup>nd</sup> Highest (date:hour)</b>
Hindley Street	352	7.2	21 Sep:01	6.1	17 Mar:04
Elizabeth	310	0.9	30 May:12	0.7	25 Apr:02

### Nitrogen dioxide

Table 9 2002 summary statistics for daily peak 1-hour NO<sub>2</sub> in South Australia

AAQ NEPM Standard 0.12 ppm (1-hr average)

<b>Region/ Performance monitoring station</b>	<b>Number of valid days</b>	<b>Highest (ppm)</b>	<b>Highest (date:hour)</b>	<b>2<sup>nd</sup> Highest (ppm)</b>	<b>2<sup>nd</sup> Highest (date:hour)</b>
Gawler	344	0.050	18 Jul:18	0.046	23 Sep:18
Elizabeth	351	0.040	18 Apr:17	0.038	11 Apr:18
Northfield	348	0.047	16 Dec:20	0.046	11 Oct:18
Netley	320	0.050	17 Dec:08	0.048	13 Feb:08
Kensington	353	0.041	18 Apr:17	0.037	11 Apr:18
Mt Gambier	245	0.038	28 May:09	0.035	3 May:18

## Ozone

Table 10 2002 summary statistics for daily peak 1-hour O<sub>3</sub> in South Australia

AAQ NEPM Standard 0.10 ppm (1-hr average)

<b>Region/ Performance monitoring station</b>	<b>Number of valid days</b>	<b>Highest (ppm)</b>	<b>Highest (date:hour)</b>	<b>2<sup>nd</sup> Highest (ppm)</b>	<b>2<sup>nd</sup> Highest (date:hour)</b>
Gawler	357	0.056	27 Dec:15	0.053	15 Mar:16
Elizabeth	353	0.070	19 Dec:13	0.070	21 Dec:11
Northfield	365	0.080	19 Dec:11	0.069	21 Dec:11
Netley	364	0.087	19 Dec:11	0.079	16 Dec:16
Kensington	358	0.086	17 Dec:12	0.074	21 Dec:11
Mt Gambier	245	0.044	14 Feb:15	0.042	12 Jan:01 and 18 Apr:15

Table 11 2002 summary statistics for daily peak 4-hour O<sub>3</sub> in South Australia

AAQ NEPM Standard 0.08 ppm (4-hr average)

<b>Region/ Performance monitoring station</b>	<b>Number of valid days</b>	<b>Highest (ppm)</b>	<b>Highest (date:hour)</b>	<b>2<sup>nd</sup> Highest (ppm)</b>	<b>2<sup>nd</sup> Highest (date:hour)</b>
Gawler	357	0.050	26 Jan:15	0.050	27 Dec:16
Elizabeth	354	0.057	19 Dec:14 and 21 Dec:13	0.051	17 Dec:12
Northfield	365	0.064	19 Dec:13	0.057	21 Dec:14
Netley	364	0.066	19 Dec:14	0.060	21 Dec:14
Kensington	358	0.073	17 Dec:14	0.060	21 Dec:13
Mt Gambier	245	0.042	14 Feb:18	0.038	23 Mar:19

## Sulfur dioxide

Table 12 2002 summary statistics for daily peak 1-hour SO<sub>2</sub> in South Australia

AAQ NEPM Standard 0.20 ppm (1-hr average)

<b>Region/ Performance monitoring station</b>	<b>Number of valid days</b>	<b>Highest (ppm)</b>	<b>Highest (date:hour)</b>	<b>2<sup>nd</sup> Highest (ppm)</b>	<b>2<sup>nd</sup> Highest (date:hour)</b>
Christies Beach	211	<b>0.225</b>	16 Oct:03	0.195	5 Aug:18
Elizabeth	184	0.012	18 Jul:10	0.010	29 Jun:04
Northfield	64	0.036	21 Dec:18	0.035	21 Dec:19
Kensington	141	0.019	17 Nov:10	0.012	14 Sep:01
Mt Gambier	218	0.012	18 Apr:02	0.011	20 Jan:00-02

Table 13 2002 summary statistics for daily peak 24-hour SO<sub>2</sub> in South Australia

AAQ NEPM Standard 0.08 ppm (24-hr average)

<b>Region/ Performance monitoring station</b>	<b>Number of valid days</b>	<b>Highest (ppm)</b>	<b>Highest (date)</b>	<b>2<sup>nd</sup> Highest (ppm)</b>	<b>2<sup>nd</sup> Highest (date)</b>
Christies Beach	211	0.049	5 Aug	0.030	16 Oct
Elizabeth	184	0.006	29 Jun	0.005	19 Jul
Northfield	64	0.018	23 Dec	0.013	22 Dec
Kensington	135	0.006	14 Sep	0.005	11 Sep
Mt Gambier	141	0.005	20 Jan	0.005	25 Feb



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

Table 14 2002 summary statistics for 24-hour PM<sub>10</sub> in South AustraliaAAQ 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)	6 <sup>th</sup> Highest (µg/m <sup>3</sup> )	6 <sup>th</sup> Highest (date)
Kensington	174	<b>103.6</b>	11 July	25.6	19 Oct
Netley	365	<b>79.3</b>	11 July	42.6	25 Apr and 3 Nov
Gawler	171	<b>50.7</b>	11 July	39.1	22 Oct
Port Augusta*	56	47.1	1 Feb	28.6	4 Nov
Whyalla*	98	<b>59.2</b>	27 Aug	40.1	19 Dec
Port Pirie Oliver Street*	59	<b>57.0</b>	29 Oct	45.7	22 Dec
Mt Gambier	243	<b>69.6</b>	7 Jun	36.3	17 Jun

\* Monitoring by high-volume sampler (one in six days), otherwise monitoring is by TEOM.

## 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 2002

AAQ NEPM Standard 9.0 ppm (8-hr average)

<b>Region/ Performance monitoring station</b>	<b>Data availability (% of days)</b>	<b>Max (ppm)</b>	<b>99<sup>th</sup> percentile (ppm)</b>	<b>98<sup>th</sup> percentile (ppm)</b>	<b>95<sup>th</sup> percentile (ppm)</b>	<b>90<sup>th</sup> percentile (ppm)</b>	<b>75<sup>th</sup> percentile (ppm)</b>	<b>50<sup>th</sup> percentile (ppm)</b>
Hindley Street	96	7.16	4.72	4.37	3.62	3.01	2.27	1.57
Elizabeth	84	0.80	0.39	0.31	0.21	0.14	0.06	0.02

### Nitrogen dioxide

Table 16 Percentiles of daily peak 1-hour NO<sub>2</sub> concentrations for 2002

AAQ NEPM Standard 0.12 ppm (1-hr average)

<b>Region/ Performance monitoring station</b>	<b>Data availability rates (%)</b>	<b>Max (ppm)</b>	<b>99<sup>th</sup> percentile (ppm)</b>	<b>98<sup>th</sup> percentile (ppm)</b>	<b>95<sup>th</sup> percentile (ppm)</b>	<b>90<sup>th</sup> percentile (ppm)</b>	<b>75<sup>th</sup> percentile (ppm)</b>	<b>50<sup>th</sup> percentile (ppm)</b>
Gawler	92	0.050	0.025	0.019	0.014	0.010	0.006	0.003
Elizabeth	94	0.040	0.025	0.021	0.016	0.012	0.006	0.003
Northfield	94	0.047	0.027	0.025	0.021	0.017	0.010	0.004
Netley	86	0.050	0.032	0.029	0.025	0.022	0.015	0.006
Kensington	94	0.041	0.024	0.022	0.017	0.013	0.007	0.003
Mt Gambier	66	0.038	0.024	0.022	0.018	0.014	0.007	0.004

## Ozone

Table 17 Percentiles of daily peak 1-hour O<sub>3</sub> concentrations for 2002

AAQ NEPM Standard 0.10 ppm (1-hr average)

<b>Region/ Performance monitoring station</b>	<b>Data availability rates (%)</b>	<b>Max (ppm)</b>	<b>99<sup>th</sup> percentile (ppm)</b>	<b>98<sup>th</sup> percentile (ppm)</b>	<b>95<sup>th</sup> percentile (ppm)</b>	<b>90<sup>th</sup> percentile (ppm)</b>	<b>75<sup>th</sup> percentile (ppm)</b>	<b>50<sup>th</sup> percentil (ppm)</b>
Gawler	95	0.056	0.040	0.036	0.033	0.030	0.026	0.021
Elizabeth	95	0.072	0.042	0.038	0.034	0.031	0.027	0.022
Northfield	98	0.080	0.042	0.038	0.033	0.030	0.026	0.020
Netley	95	0.087	0.039	0.035	0.031	0.029	0.025	0.017
Kensington	96	0.086	0.043	0.039	0.035	0.031	0.028	0.022
Mt Gambier	67	0.044	0.033	0.030	0.028	0.026	0.021	0.015

## Sulfur dioxide

Table 18 Percentiles of daily peak 1-hour SO<sub>2</sub> concentrations for 2002

AAQ NEPM Standard 0.20 ppm (1-hr average)

<b>Region/ Performance monitoring station</b>	<b>Data availability (% of days)</b>	<b>Max (ppm)</b>	<b>99<sup>th</sup> percentile (ppm)</b>	<b>98<sup>th</sup> percentile (ppm)</b>	<b>95<sup>th</sup> percentile (ppm)</b>	<b>90<sup>th</sup> percentile (ppm)</b>	<b>75<sup>th</sup> percentile (ppm)</b>	<b>50<sup>th</sup> percentil (ppm)</b>
Christies Beach	58	0.225	0.049	0.029	0.009	0.003	0.002	0.001
Elizabeth	48	0.012	0.006	0.005	0.005	0.004	0.003	0.002
Northfield	16	0.036	0.025	0.015	0.007	0.005	0.002	0.001
Kensington	37	0.019	0.007	0.007	0.006	0.005	0.003	0.002
Mt Gambier	47	0.012	0.007	0.006	0.005	0.004	0.002	0.001

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

Table 19 Percentiles of daily peak 24-hour PM<sub>10</sub> concentrations for 2002AAQ NEPM Standard 50 µg/m<sup>3</sup> (24-hr average)

<b>Region/ Performance monitoring station</b>	<b>Data availability rates (%)</b>	<b>Max (ppm)</b>	<b>99<sup>th</sup> percentile (ppm)</b>	<b>98<sup>th</sup> percentile (ppm)</b>	<b>95<sup>th</sup> percentile (ppm)</b>	<b>90<sup>th</sup> percentile (ppm)</b>	<b>75<sup>th</sup> percentile (ppm)</b>	<b>50<sup>th</sup> percentile (ppm)</b>
Kensington	48	103.7	34.5	28.1	24.4	22.2	18.2	14.3
Netley	99	79.3	43.1	38.6	31.6	27.5	22.8	18.7
Gawler	47	50.7	45.0	40.6	31.5	26.6	20.3	15.5
Port Augusta*	92	47.1	44.3	41.2	32.6	27.3	18.4	11.5
Whyalla*	99	59.2	43.8	43.2	40.2	26.1	20.0	14.4
Port Pirie Oliver Street*	97	57.0	50.4	45.1	33.4	31.3	27.8	21.2
Mt Gambier	67	69.6	42.0	36.4	29.2	27.2	21.3	16.8

\* Monitoring by high-volume sampler (one in six days), otherwise monitoring is by TEOM.