Air Monitoring Report 2005

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

December 2006

Air Monitoring Report 2005:
Produced in compliance with the National Environment Protection (Ambient Air Quality) Measure, for the National Environment Protection Council
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Section A - 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 2005 indicated that:

- Where sufficient data were available to compare with the goals set by the AAQ NEPM (to be achieved by 2008), the goal of AAQ NEPM was met for all pollutants, except for 1 hour sulfur dioxide, PM_{10} particles and lead at Port Pirie and PM_{10} particles at Elizabeth and 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.
- Exceedences of the PM_{10} standard occurred on numerous occasions throughout the state. The majority occurred on hot dry days, accompanied with Northerly winds.
- In Port Pirie, the annual lead standard was exceeded at one NEPM site. The 1-hour SO_2 standard was exceeded forty seven times and the 24 hour PM_{10} standard was exceeded on six occasions.
- Consistently high data capture rates were achieved in most cases, except where instrument malfunction occurred or sites were decommissioned during 2005.
- During 2005 monitoring was concluded at:
    - Gawler (O_3, NO_2, PM_{10})
    - Hindley Street (CO)
    - Port Pirie (O_3, NO_2)
    - Kensington (SO_2)
- Development of monitoring stations continues in order to meet the monitoring requirements specified in the plan. The stations yet to be developed include:
    - Tandanya as a replacement for Hindley Street, Adelaide (CO)
    - North east Adelaide (PM_{10} and SO_2)
    - Southern wineries (O_3, NO_2, PM_{10}, SO_2)
    - Barossa / Angaston (O_3, NO_2, PM_{10}, SO_2)
    - Riverland (O_3, NO_2, PM_{10}, SO_2)

NOTE: There has been some delay in the planned installation of the above sites. This is due to the $PM_{2.5}$ variation to the Ambient Air Quality NEPM and associated co-location studies at Netley, which require use of TEOM monitoring units otherwise planned for north eastern Adelaide. The southern metropolitan site was installed in January 2006 and results will be reported next year.

Current performance monitoring stations

The AAQ NEPM requires the assessment of carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), lead (Pb) and particles less than 10 micrometres in

diameter (PM_{10}) (NEPC, 1998). In 2003, the AAQ NEPM was varied to include monitoring of particles less than 2.5 micrometres in diameter ($PM_{2.5}$)

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 where air pollutants are measured. Five regions have been identified in the monitoring plan: Adelaide, Spencer, Mount Gambier, Riverland and Barossa.

Monitoring stations are classed as peak, campaign or generally representative upper bound sites (GRUB) to indicate how they relate to community exposure (NEPC PRC, 2001). 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. Figures 1 and 2 below show current monitoring stations and population density within the Adelaide and Spencer regions. The monitoring stations within the Adelaide region represent an exposed population of 1,037,263. Monitoring within the Spencer region represent an exposed population of 53,988 (SA EPA, 2001).

Additions to the monitoring network

The EPA moved closer to fulfilling commitments made in SA's monitoring plan by the installation of an Air NEPM station in the southern metropolitan area of Adelaide. Monitoring at this site commenced in March 2006 and includes O_3, NO_2, PM_{10} and SO_2.

In May 2003 the NEPM was varied to include particles less than 2.5 micrometers in diameter ($PM_{2.5}$). In accordance with this variation, the SA EPA has altered its monitoring plan to include $PM_{2.5}$ monitoring at its Netley station using the reference method on a one in three day basis. This is in addition to monitoring $PM_{2.5}$ by Tapered Element Oscillating Microbalance (TEOM) as part of the $PM_{2.5}$ equivalence program.

Table 1 below describes the station type, pollutants monitored, methods used and locations of stations where data were collected for the 2005 reporting year. Table 2 describes compliance of stations with siting criteria not covered in the monitoring plan.

Table 1 Summary of South Australian current performance monitoring stations

Performance monitoring station	Region (site type)	AAQ NEPM pollutants and method of measurement						
		CO AS3580.7.1 -1992	NO_2 AS3580.5.1 -1993	O_3 AS3580.6.1 -1990	SO_2 AS3580.4.1 -1990	Pb AS2724.3-1984 AS2800-1985	PM_{10} AS3580.9.8 -2001	$PM_{2.5}$ AS3580.9.8 -2001 DR 04060
Adelaide								
Elizabeth Heard St. Elizabeth Downs	Adelaide (GRUB)	×	×	×	×		×	
Northfield Folland Ave. Hampstead	Adelaide (GRUB)		×	×	×			
Netley Transport Ave. Netley	Adelaide (GRUB)		×	×			×	×
Kensington East Tce. Kensington	Adelaide (GRUB)		×	×	×		×	
Hindley Street Hindley St. Adelaide	Adelaide (peak)	×						
Spencer								
Pt Pirie, Oliver Street Oliver St. Port Pirie	Spencer (GRUB and campaign)		×	×	×	×	×	
Pt Pirie, Frank Green Park Senate Rd. Port Pirie	Spencer (GRUB)					×		
Whyalla, Civic Park Searle St. Whyalla	Spencer (Campaign)						×	
Whyalla, Nicolson Avenue Nicolson Ave. Whyalla	Spencer (Campaign)		×	×	×			

Table 2 Compliance with AS 2922-1987 for stations not covered in the monitoring plan

Region, Site Name	Height Above Ground	Min. Distance to Support Structure	Clear Sky Angle of 120°	Unrestricted Airflow 270/360	20m From Trees	No Boiler or Incinerators Nearby	Min Distance from Road or Traffic	Comments
Whyalla Searle Street Whyalla Norrie	✔	✔	×	×	×	✔	✔	Plans to move site to comply with standard
Whyalla, Nicolson Avenue Nicolson Ave.	✔	✔	✔	✔	×	✔	×	Adjacent to carpark

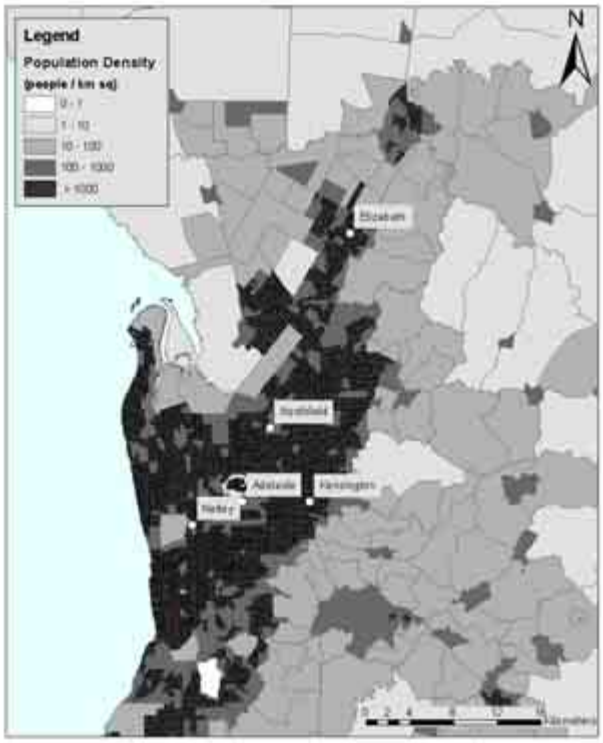

Figure 1 Adelaide region and population density with current monitoring sites. Based on the 2001 census (Australian Bureau of Statistics, 2001).

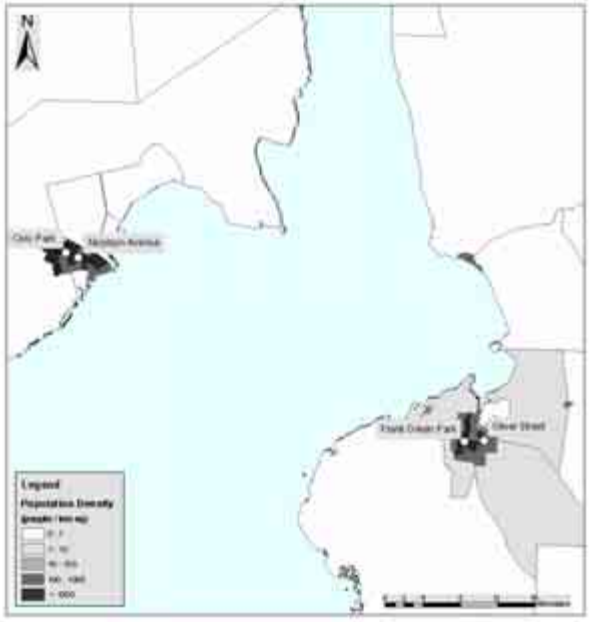

Figure 2 Spencer region and population density with current monitoring sites. Based on the 2001 census (Australian Bureau of Statistics, 2001).

Note: map does not include Port Augusta as monitoring did not occur during 2005

NATA status

The South Australian Environment Protection Authority operates all monitoring stations described in this report. The EPA obtained NATA accreditation of its monitoring network and laboratory in February of 2006 (accreditation number 15220).

Screening

The AAQ NEPM, through PRC Technical paper 4 'Screening Procedures', provides a mechanism for discontinuing monitoring where pollutant levels are consistently below the standards (NEPC PRC, 2001). Using screening procedure A, monitoring was discontinued during 2005 at Port Pirie for O_3 and NO_2. Details of the screening procedure can be found in the SA EPA report on monitoring at Port Pirie (in Publication). Monitoring of SO_2 was also discontinued at Kensington, Christies Beach and Elizabeth, the results of which have been presented in an EPA publication (Riordan & Adeeb, 2004). Tables 3 to 9 also include stations where monitoring was concluded using screening procedures.

The campaign monitoring site at Gawler was discontinued following 12 months of monitoring, as outlined in the monitoring plan. The data has been assessed against the screening criteria and a report published (EPA, 2006). The future of monitoring in Gawler will be considered further following completion of the SAEPA campaign monitoring program.

Section B - Assessment of Compliance with Standards and 2008 Goal

Tables 3 to 9 provide 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 insufficient data are 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 3 2005 compliance summary for CO in South Australia

AAQ NEPM Standard 9.0 ppm (8-hr average)

Region	Data availability rates (% of 8 hour rolling averages)					Number of exceedences (days)	Performance against the standards and goal
performance monitoring station/s	Q1	Q2	Q3	Q4	Annual		
Adelaide							
*Hindley Street	100	81	0	0	45	0	ND
Elizabeth	99	85	91	99	94	0	Met

ND: Not Demonstrated or greater than 75% data capture was not achieved for all four quarters

*Monitoring at this site was discontinued in May 2005 due to building refurbishment. A new site has been selected and will be commissioned in 2006.

Nitrogen dioxide

Table 4 2005 compliance summary for NO_2 in South Australia

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

Region performance monitoring station/s	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
Adelaide									
Elizabeth	97	88	97	96	95	0	0.004	Met	Met
Northfield	97	97	98	85	94	0	0.006	Met	Met
Netley	98	96	98	97	97	0	0.009	Met	Met
Kensington	98	97	98	98	97	0	0.005	Met	Met
Spencer									
*Pt Pirie	95	98	44	0	59	0	0.003	ND	ND
*Whyalla	63	97	91	69	80	0	0.003	ND	ND

* Pt Pirie and Whyalla are regional centres, all other sites are within the Adelaide metropolitan area.

ND: Not Demonstrated or greater than 75% data capture was not achieved for all four quarters

Regions / stations which do not require monitoring on the basis of screening arguments under Clause 14(3) of the NEPM and PRC Technical Paper No. 4 (PRC, 2001) that pollutant levels are reasonably expected to be consistently below the standard

SPENCER

Screening Procedure A from PRC Technical Paper 4 was applied to the following stations

Port Pirie (in publication)

Ozone

Table 5 2005 compliance summary for O_3 in South Australia

AAQ NEPM Standards 0.10 ppm (1-hr average), 0.08 ppm (4-hr average)

Region performance monitoring station/s	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
Adelaide									
Elizabeth	98	98	98	96	97	0	0	Met	Met
Northfield	98	98	98	85	94	0	0	Met	Met
Netley	98	96	97	97	97	0	0	Met	Met
Kensington	97	97	98	98	98	0	0	Met	Met
Spencer									
*Pt Pirie	92	93	42	0	56	0	0	ND	ND
*Whyalla	97	88	98	92	94	0	0	Met	Met

* Pt Pirie and Whyalla are regional centres, all other sites are within the Adelaide metropolitan area.

ND: Not Demonstrated or greater than 75% data capture was not achieved for all four quarters

Regions / stations which do not require monitoring on the basis of screening arguments under Clause 14(3) of the NEPM and PRC Technical Paper No. 4 (PRC, 2001) that pollutant levels are reasonably expected to be consistently below the standard

SPENCER

Screening Procedure A from PRC Technical Paper 4 was applied to the following stations

Port Pirie (in Publication)

Sulfur dioxide

Table 6 2005 compliance summary for SO_2 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/s	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
Adelaide											
Northfield	96	96	98	85	93	0	0	0.000	Met	Met	Met
Spencer											
*Pt Pirie	94	92	92	97	94	29	0	0.009	Not met	Met	Met
*Whyalla	96	96	98	92	95	0	0	0.001	Met	Met	Met

* Pt Pirie and Whyalla are regional centres, all other sites are within the Adelaide metropolitan area.

ND: Not Demonstrated

Regions / stations which do not require monitoring on the basis of screening arguments under Clause 14(3) of the NEPM and PRC Technical Paper No. 4 (PRC, 2001) that pollutant levels are reasonably expected to be consistently below the standard

ADELAIDE

Screening Procedure A from PRC Technical Paper 4 was applied to the following stations:

Christies Beach (Riordan and Adeeb, 2004)

Kensington (Riordan and Adeeb, 2004)

Elizabeth (Riordan and Adeeb, 2004)

Particulate matter as PM_{10}

Table 7 2005 compliance summary for PM_{10} in South Australia

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

Region performance monitoring station/s	Data availability rates (% of days) Q1	Q2	Q3	Q4	Annual	Number of exceedences (days)	Performance against the standards and goal
Adelaide							
Elizabeth	90	96	96	99	95	6	Not Met
Kensington	96	97	100	99	98	2	Met
Netley	88	84	91	97	90	6	Not Met
Spencer							
*^Whyalla (Civic Park)	31	24	22	33	27	1	ND
^Pt Pirie (Oliver Street)	94	98	89	99	95	6	Not Met

*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.

ND: Not Demonstrated or greater than 75% data capture was not achieved for all four quarters

Lead

Table 8 2005 compliance summary for Lead in South Australia

AAQ NEPM Standard 0.50 µg / m³ (1-yr average)

Region performance monitoring station / s	Data availability rates (% of days) Q1	Q2	Q3	Q4	Annual	Annual mean (µg / m³)	Performance against the standards and goal
Spencer							
*Pt Pirie Frank Green Park	100	100	100	94	98	0.25	Met
*Pt Pirie Oliver Street	100	100	100	94	98	0.60	Not Met

*Pt Pirie is a regional centre.

Regions / stations which do not require monitoring on the basis of screening arguments under Clause 14(3) of the NEPM and PRC Technical Paper No. 4 (PRC, 2001) that pollutant levels are reasonably expected to be consistently below the standard

ADELAIDE

Screening Procedure A from PRC Technical Paper 4 was applied to the following stations

Gilles Plains (Adeeb, 2005)

Northfield (Adeeb, 2005)

Thebarton (Adeeb, 2005)

Parkside (Adeeb, 2005)

Kensington (Adeeb, 2005)

Lead data is reported to ambient conditions and analyses were carried out by NATA accredited facilities at the South Australian Forensic Science laboratories until August 2005, after which analyses were carried out by the pathology Queensland Health Scientific Services.

Particulate matter as $PM_{2.5}$

Table 9 2005 compliance summary for $PM_{2.5}$ in South Australia

AAQ NEPM Advisory Reporting Standard 25 µg / m³ (24-hr average), 8 µg / m³ (1-yr average)

Region performance monitoring station/s	Data availability rates (% of days) Q1	Q2	Q3	Q4	Annual	Annual 1h Mean (µg/m³)
Adelaide						
^Netley	0	8	24	23	14	7
*Netley	100	86	100	100	96	8

^Indicates monitoring by one –day-in-three partisol monitoring

***Indicates monitoring by Tapered Element Oscillating Microbalance (TEOM)**

Section C - Analysis of Air Quality Monitoring

Progress Towards Achieving the AAQ NEPM 2008 Goal

As assessed against the National Environment Protection (Ambient Air Quality) Measure (NEPC, 1998), the following observations were made for 2005:

- For CO, the standard and goal was met at Elizabeth but not demonstrated at Hindley Street
- For NO_2, the standards and goal were met at all stations but not demonstrated at Port Pirie and Whyalla
- For O_3, the standard and goal were met at all stations but not demonstrated at Port Pirie
- For SO_2 the 1h standard and goal was not met at Port Pirie. All other stations met the standard and goal for SO_2.
- For PM_{10} the standard was not met on one occasion at Whyalla, on two occasions at Kensington and six occasions at Elizabeth and Netley. For the Spencer region, the standard was not met on one occasion at Whyalla and on six occasions Port Pirie. The goal was not met at Elizabeth, Netley and Port Pirie, but met for all other stations for this reporting period.
- For Pb, the annual standard and goal was not met at Port Pirie Oliver Street.
- For $PM_{2.5}$ the advisory reporting standard was met at Netley, the one station where monitoring was conducted.
- There were instances where compliance with the goal could not be demonstrated, shown as 'ND'. For example, compliance of NO_2 at Port Pirie and CO at Hindley Street was assessed as 'not demonstrated'. This was due to insufficient data recovery averaged over the 3rd and 4th quarter. Some data for PM_{10} and O_3 was likewise classed as 'ND'. These lower data recovery rates were due to a range of causes. This included campaign stations being decommissioned part way through 2005, instrument upgrade or insufficient sampling frequency.
- For pollutants where data capture is low or where monitoring ceased through application of screening criteria, the AAQ NEPM 2008 goal was most likely achieved at these stations, despite insufficient data to demonstrate compliance.

Circumstances which led to Exceedences

Exceedences of the PM_{10} standard occurred on a number of occasions throughout the state. This was often associated with dry days, coupled with strong northerly winds. Table 10 below summarises dates and times of exceedences occurring during the 2005 reporting year.

Exceedences of the Pb and SO_2 standards and goals occurred at Port Pirie. These exceedences were due to emissions from a point source located within the region, coupled with suitable meteorological conditions. Table 11 summarises dates and times of exceedences occurring during the 2005 reporting year.

Table 10 Summary of PM_{10} exceedences during 2005 in South Australia

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

Date of Exceedence (dd mon)	Region / Site and Exceedence Value (ug/m3)				
	Adelaide Region			Spencer Region	
	Elizabeth	Kensington	Netley	Whyalla (Civic Park)	Pt Pirie (Oliver Street)
3 Jan	54				81
11 Jan			56		50
23 Feb	61				
1 Mar	56				59
12 Mar			52		
2 Apr	85	76			464
9 April			59		
28 Apr	77		51		
25 Nov			55		
27 Dec				81	76
31 Dec	61	52	56		89

Table 11 Summary of SO_2 exceedences during 2005 in South Australia

AAQ NEPM Standard 0.20 ppm (1-hr average)

Date / time of Exceedence (dd mon hh:mm)	Region / Site and Exceedence Value (ug/m3)
	Spencer Region
	Pt Pirie (Oliver Street)
10 Jan 16:00	0.22
31 Jan 11:00	0.21
6 Feb 16:00	0.72
10 Mar 12:00	0.30
20 Mar 11:00	0.21
28 Mar 13:00	0.22
12 Apr 14:00	0.33
22 Apr 13:00	0.25
26 Apr 13:00	0.23
29 May 11:00	0.20
3 Jul 14:00	0.20
17 Jul 14:00	0.21
18 Jul 13:00	0.21
6 Aug 15:00	0.23
1 Sep 16:00	0.39
5 Sep 12:00	0.23
9 Sep 13:00	0.39
17 Sep 16:00	0.38
20 Sep 13:00	0.31
29 Sep 17:00	0.31
2 Oct 12:00	0.51
9 Oct 18:00	0.31
3 Dec 13:00	0.39
5 Dec 13:00	0.25
11 Dec 18:00	0.23
14 Dec 10:00	0.37
16 Dec 14:00	0.26
19 Dec 10:00	0.39
26 Dec 11:00	0.24

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

Annual summary statistics described in tables 12 to 19 below allow assessment of air quality against the standards and the extent of compliance with the goal. Instances where the standard or goal has been exceeded are highlighted in bold. The AAQ NEPM states that the short-term standards should not be exceeded on more than one day for CO, NO_2, O_3, SO_2 and on no more than five days per year for PM_{10} (NEPC, 2002). The second highest daily value for the year (or the sixth for PM_{10}) indicates the extent to which the standards are or are not met.

Carbon monoxide

Table 12 2005 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/s	Number of valid days	Highest (ppm)	Highest (dd mon hh:mm)	2nd highest (ppm)	2nd highest (dd mon hh:mm)
Adelaide					
Hindley Street	168	5.0	7 Jun 20:00	4.9	14 May 01:00
Elizabeth	347	0.8	9 Jul 00:00	0.7	29 Jun 09:00

Nitrogen dioxide

Table 13 2005 summary statistics for daily peak 1-hour NO_2 in South Australia

AAQ NEPM Standard 0.12 ppm (1-hr average)

Region performance monitoring station/s	Number of valid days	Highest (ppm)	Highest (dd mon hh:mm)	2nd highest (ppm)	2nd highest (dd mon hh:mm)
Adelaide					
Elizabeth	357	0.038	26 Apr 19:00	0.034	01 Mar 09:00
Northfield	355	0.039	12 Apr 20:00	0.038	12 May 18:00
Netley	365	0.051	25 Aug 08:00	0.046	02 Nov 08:00
Kensington	365	0.031	01 Mar 08:00, 27 Apr 18:00	0.030	7 Jun 18:00
Spencer					
Pt Pirie	223	0.023	27 Apr 19:00, 30 Jun 19:00	0.022	23 Apr 19:00, 15 Jul 19:00
Whyalla	314	0.025	20 Jul 19:00	0.024	07 Jun 18:00, 18 Jul 19:00

Ozone

Table 14 2005 summary statistics for daily peak 1-hour O_3 in South Australia

AAQ NEPM Standard 0.10 ppm (1-hr average)

Region performance monitoring station/s	Number of valid days	Highest (ppm)	Highest (dd mon hh:mm)	2nd highest (ppm)	2nd highest (dd mon hh:mm)
Adelaide					
Elizabeth	365	0.062	25 Jan 17:00, 27 Feb 17:00, 13 Mar 15:00	0.059	31 Oct 17:00
Northfield	354	0.060	27 Feb 15:00	0.057	13 Feb 18:00
Netley	365	0.079	25 Jan 13:00	0.057	22 Feb 13:00
Kensington	365	0.061	13 Feb 18:00	0.060	27 Feb 15:00
Spencer					
Pt. Pirie	223	0.044	04 Jun 11:00	0.042	28 Jan 16:00
Whyalla	352	0.046	01 Nov 16:00	0.045	06 Apr 15:00

Table 15 2005 summary statistics for daily peak 4-hour O_3 in South Australia

AAQ NEPM Standard 0.08 ppm (4-hr average)

Region performance monitoring station/s	Number of valid days	Highest (ppm)	Highest (dd mon hh:mm)	2nd highest (ppm)	2nd highest (dd mon hh:mm)
Adelaide					
Elizabeth	365	0.056	13 Mar 16:00	0.053	25 Jan 18:00
Northfield	355	0.054	27 Feb 16:00	0.052	13 Feb 19:00,
Netley	365	0.072	25 Jan 15:00	0.052	13 Feb 19:00
Kensington	365	0.055	13 Feb 19:00	0.053	27 Feb 17:00
Spencer					
Pt Pirie	223	0.040	25 Jan 16:00	0.038	06 Apr 15:00
Whyalla	352	0.044	06 Apr 16:00	0.043	01 Nov 18:00

Sulfur dioxide

Table 16 2005 summary statistics for daily peak 1-hour SO_2 in South Australia

AAQ NEPM Standard 0.20 ppm (1-hr average)

Region performance monitoring station/s	Number of valid days	Highest (ppm)	Highest (dd mon hh: mm)	2nd highest (ppm)	2nd highest (dd mon hh: mm)
Adelaide					
Northfield	355	0.015	22 May 17:00	0.009	06 Jun 13:00, 4 May 23:00
Spencer					
Pt Pirie	356	**0.721**	**06 Feb 17:00**	**0.513**	**02 Oct 13:00**
Whyalla	361	0.052	16 Apr 15:00	0.046	12 Sep 22:00

Table 17 2005 summary statistics for daily peak 24-hour SO_2 in South Australia

AAQ NEPM Standard 0.08 ppm (24-hr average)

Region performance monitoring station/s	Number of valid days	Highest (ppm)	Highest (dd mon)	2nd highest (ppm)	2nd highest (dd mon)
Adelaide					
Northfield	352	0.004	22 May	0.003	20 May, 23 May
Spencer					
Pt Pirie	346	0.072	20 Sep	0.069	02 Oct
Whyalla	359	0.007	16 Apr	0.006	12 Sep

Particulate matter as PM_{10}

Table 18 2005 summary statistics for 24-hour PM_{10} in South Australia

AAQ NEPM Standard 50 µg/m³ (24-hr average)

Region performance monitoring station/s	Number of valid days	Highest (µg/m³)	Highest (dd mon)	6th highest (µg/m³)	6th highest (dd mon)
Adelaide					
Elizabeth	347	**85**	**02 Apr**	49	12 Mar, 13 Apr
Kensington	357	**76**	**02 Apr**	38	03 Jan
Netley	328	**59**	**09 Apr**	49	27 Dec
Spencer					
*Whyalla (Civic Park)	100	**81**	**27 Dec**	29	19 Jan
Pt Pirie (Oliver Street)	347	**464**	**02 Apr**	50	11 Jan

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

Particulate matter as $PM_{2.5}$

Table 19 2005 summary statistics for 24-hour $PM_{2.5}$ in South Australia

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

Region performance monitoring station/s	Number of valid days	Highest (µg/m³)	Highest (dd mon)	6th highest (µg/m³)	6th highest (dd mon)
Adelaide					
^Netley	50	14	31 Jul	9	28 Jun, 22 Jul, 29 Oct, 25 Nov, 06 Dec
*Netley	352	17	05 Oct, 30 May, 31 Dec	12	11 Jan, 25 Jan, 23 Feb, 7 Apr, 13 May, 6 Jun, 30 Jun, 29 Jul, 12 Aug, 5 Sep, 24 Nov, 6 Dec

^Indicates monitoring by one –day-in-three partisol monitoring

*Indicates monitoring by Tapered Element Oscillating Microbalance (TEOM)

Section D - Data Analysis

Tables 20 to 27 provide results of additional analyses of daily peak values, including percentiles of daily peak concentrations.

Carbon monoxide

Table 20 Percentiles of daily peak 8-hour CO concentrations for 2005

AAQ NEPM Standard 9.0 ppm (8-hr average)

Region performance monitoring station/s	Data availability (% of days)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Adelaide								
Hindley Street	45	5.0	4.8	4.0	3.4	3.0	2.1	1.5
Elizabeth	94	0.8	0.6	0.4	0.4	0.3	0.1	0.1

Nitrogen dioxide

Table 21 Percentiles of daily peak 1-hour NO_2 concentrations for 2005

AAQ NEPM Standard 0.12 ppm (1-hr average)

Region performance monitoring station/s	Data availability rates (%)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Adelaide								
Elizabeth	95	0.038	0.031	0.028	0.025	0.023	0.019	0.011
Northfield	94	0.039	0.035	0.033	0.030	0.028	0.024	0.018
Netley	97	0.051	0.042	0.037	0.034	0.031	0.028	0.022
Kensington	97	0.031	0.029	0.027	0.026	0.024	0.019	0.013
Spencer								
Pt Pirie	59	0.023	0.022	0.021	0.020	0.017	0.012	0.007
Whyalla	80	0.025	0.023	0.022	0.021	0.018	0.014	0.009

Ozone

Table 22 Percentiles of daily peak 1-hour O_3 concentrations for 2005

AAQ NEPM Standard 0.10 ppm (1-hr average)

Region performance monitoring station/s	Data availability rates (%)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Adelaide								
Elizabeth	97	0.062	0.057	0.050	0.041	0.036	0.032	0.029
Northfield	94	0.060	0.049	0.045	0.040	0.036	0.031	0.028
Netley	97	0.079	0.054	0.049	0.041	0.037	0.032	0.028
Kensington	98	0.061	0.053	0.051	0.044	0.039	0.034	0.031
Spencer								
Pt Pirie	56	0.044	0.041	0.038	0.035	0.033	0.030	0.028
Whyalla	94	0.046	0.040	0.039	0.036	0.034	0.031	0.029

Table 23 Percentiles of daily peak 4-hour rolling O_3 concentrations for 2005

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

Region performance monitoring station/s	Data availability rates (%)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Adelaide								
Elizabeth	99	0.056	0.049	0.044	0.038	0.034	0.030	0.028
Northfield	96	0.054	0.046	0.041	0.036	0.035	0.030	0.027
Netley	99	0.072	0.048	0.044	0.038	0.034	0.030	0.027
Kensington	100	0.055	0.050	0.044	0.040	0.037	0.032	0.029
Spencer								
Pt Pirie	58	0.040	0.037	0.035	0.033	0.032	0.029	0.027
Whyalla	96	0.044	0.038	0.037	0.035	0.033	0.030	0.028

Sulfur dioxide

Table 24 Percentiles of daily peak 1-hour SO_2 concentrations for 2005

AAQ NEPM Standard 0.20 ppm (1-hr average)

Region performance monitoring station/s	Data availability (% of hours)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Adelaide								
Northfield	93	0.015	0.008	0.006	0.004	0.003	0.001	0.001
Spencer								
Pt Pirie	94	0.721	0.391	0.362	0.234	0.186	0.105	0.042
Whyalla	95	0.052	0.026	0.019	0.011	0.007	0.003	0.001

Table 25 Percentiles of 24-hour SO_2 concentrations for 2005

AAQ NEPM Standard 0.08 ppm (24-hr average)

Region performance monitoring station/s	Data availability (% of days)	Max (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Adelaide								
Northfield	96	0.004	0.002	0.002	0.001	0.000	0.000	0.000
Spencer								
Pt Pirie	95	0.072	0.054	0.049	0.033	0.023	0.014	0.005
Whyalla	98	0.007	0.004	0.003	0.002	0.002	0.001	0.001

Particulate matter as PM_{10}

Table 26 Percentiles of daily 24-hour PM_{10} concentrations for 2005

AAQ NEPM Standard 50 µg / m³ (24-hr average)

Region performance monitoring station / s	Data availability rates (%)	Max (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)	75th percentile (µg/m³)	50th percentile (µg/m³)
Adelaide								
Elizabeth	95	85	59	49	38	30	22	15
Kensington	98	76	40	35	28	24	19	14
Netley	90	59	55	48	38	32	24	18
Spencer								
*Whyalla (Civic Park)	27	81	41	38	29	26	19	14
Pt Pirie Oliver Street	95	464	68	46	38	32	23	17

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

Particulate matter as $PM_{2.5}$

Table 27 Percentiles of daily 24-hour $PM_{2.5}$ concentrations for 2005

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

Region performance monitoring station / s	Data availability rates (%)	Max (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)	75th percentile (µg/m³)	50th percentile (µg/m³)
Adelaide								
^Netley	50	14	14	13	11	10	8	6
*Netley	96	17	16	15	13	12	9	7

^Indicates monitoring by one –day-in-three partisol monitoring

*Indicates monitoring by Tapered Element Oscillating Microbalance (TEOM)

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