Air Monitoring Report for South Australia 2009

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

June 2009

Air Monitoring Report for South Australia 2009: Compliance with the National Environment Protection (Ambient Air Quality) Measure, June 2009

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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 2009 indicated that:

- Where sufficient data were available to compare with the goals set by the AAQ NEPM (to be achieved by 2009), the goal of AAQ NEPM was met for all measured pollutants, except for 1-hour and 24-hour sulfur dioxide at Pt Pirie, 24-hour PM_{10} particles at Port Pirie, Whyalla and Elizabeth and the 24hr $PM_{2.5}$ particles at Netley.
- Exceedances of the PM_{10} standard were recorded on numerous occasions throughout the state. The majority occurred on hot dry days, accompanied by Northerly winds.
- In Port Pirie, exceedances of the 1-hour SO_2 standard were recorded on fifty two occasions and on 29 days and exceedances of the 24-hour PM_{10} standard were recorded on two occasions.
- Consistently high data capture rates were achieved in most cases, except where instrument malfunction occurred during the 2009 reporting year.
- Development of monitoring stations continues in order to meet the monitoring requirements specified in the plan. Stations yet to be developed include:
    - A replacement for the now closed Tandanya station (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 significant delay in the planned installation of the above sites. As a result of issues that emerged during 2009, to meet the State's monitoring needs, alternative use of resources was required.

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 effective aerodynamic diameter (PM_{10}) (NEPC, 1998). In 2003, the AAQ NEPM was varied to include monitoring of particles less than 2.5 micrometres effective aerodynamic 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 is currently being undertaken within the Adelaide and Spencer airsheds.

Performance monitoring stations (PMS) are designated as either trend or campaign stations to indicate the intended duration of monitoring. Trend stations are chosen to monitor pollutant levels over an extended period. Campaign sites are chosen as part of a screening program and 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 1,020,675 based on census collection districts. Monitoring within the townships of Pt Pirie and Whyalla represent an exposed population of 34,324 based on census collection districts (ABS, 2009).

Additions to the monitoring network

The EPA has made no additions to the NEPM monitoring network in 2009.

Table 1 below describes the station type, pollutants monitored, methods used and locations of stations where data were collected for the 2009 reporting year. Table 2 describes a summary of exposure at the monitoring stations. Table 3 describes compliance of stations with siting criteria not covered in the monitoring plan.

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). As a result of issues that emerged during 2009, to meet the State's other monitoring needs, alternative use of resources was required and the laboratory accreditation was voluntarily relinquished in September 2009.

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								
ELI01 - Elizabeth Downs	Adelaide (Trend)	×	×	×			×	
NOR01 - Northfield	Adelaide (Trend)		×	×	×			
NET01 - Netley	Adelaide (Trend)		×	×			×	×
KEN01 - Kensington Gardens	Adelaide (Trend)		×	×			×	
CHD01 - Christie Downs	Adelaide (Trend)		×	×			×	
Spencer								
PTP01 - Pt Pirie Oliver Street	Spencer (Trend)				×	×	×	
PTP05 - Pt Pirie Frank Green Park	Spencer (Trend)					×		
WHY07 - Whyalla Schulz Park	Spencer (Trend)						×	

Table 2 Summary of Exposure at South Australian Performance Monitoring Stations

Performance monitoring station	**Region** **(site type / exposed population)**
Adelaide	
ELI01 - Elizabeth Downs Heard St. Elizabeth Downs	Trend station in a largely residential area within the Northern Adelaide airshed
NOR01 - Northfield Folland Ave. Hampstead	Trend station in a largely residential area within the Central Adelaide airshed
NET01 - Netley Transport Ave. Netley	Trend station in a largely residential area within the Central Western Adelaide airshed
KEN01 - Kensington Gardens East Tce. Kensington	Trend station in a largely residential area within the Central Eastern Adelaide airshed
CHD01 - Christie Downs Sabina Cres. Christie Downs	Trend station in a largely residential area within the Southern Adelaide airshed
Spencer	
PTP01 - Pt Pirie, Oliver Street Oliver St. Port Pirie	Trend station in a largely residential area within an industrial township in the Spencer airshed
PTP05 - Pt Pirie, Frank Green Park Senate Rd. Port Pirie	Trend station in a largely residential area within an industrial township in the Spencer airshed
WHY07 - Whyalla, Schulz Park McLennan Ave. Whyalla Norrie	Trend station in a largely residential area within an industrial township in the Spencer airshed

Table 3 Compliance with AS 3580.1.1 2007 for stations.

Region Site Name	Height Above Ground	Min. distance to support structure	Clear Sky Angle of 120O	Unrestricted Airflow 270/360	20m From Trees	No Boiler or Incinerators Nearby	Min Distance from Road or Traffic	Comments
Adelaide								
ELI01 - Elizabeth Downs	✔	✔	✔	✔	✘	✔	✔	Residential area
NOR01 - Northfield	✔	✔	✔	✔	✔	✔	✔	Residential area
NET01 - Netley	✔	✔	✔	✔	✘	✔	✔	Light industrial, heavy traffic
KEN01 - Kensington Gardens	✔	✔	✘	✘	✘	✔	✔	30 m-high gums @ 10 m, but clear aspect— thin, high canopy
CHD01 - Christie Downs	✔	✔	✔	✔	✔	✘	✔	Residential area
Spencer								
PTP01 - Pt Pirie Oliver Street	✔	✔	✔	✔	✔	✔	✔	Residential area Type 2
PTP05 - Pt Pirie Frank Green Park	✔	✔	✔	✔	✔	✔	✔	Residential area Type 2
WHY07 - Whyalla Schulz Park	✔	✔	✔	✔	✔	✔	✔	Residential area Type 2

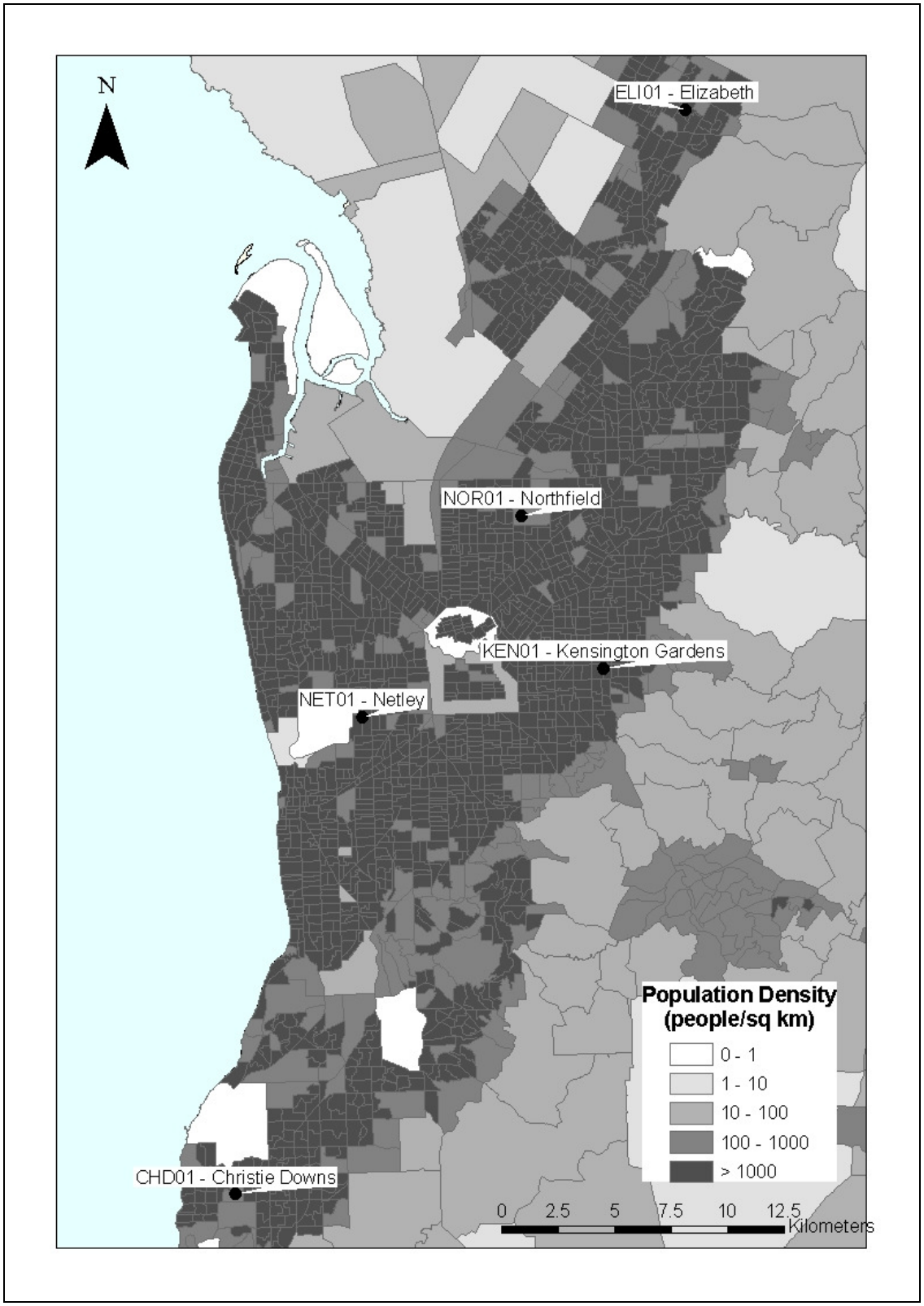

Figure 1 Adelaide region and population density based on the 2006 census (Australian Bureau of Statistics 2009) with current monitoring sites.

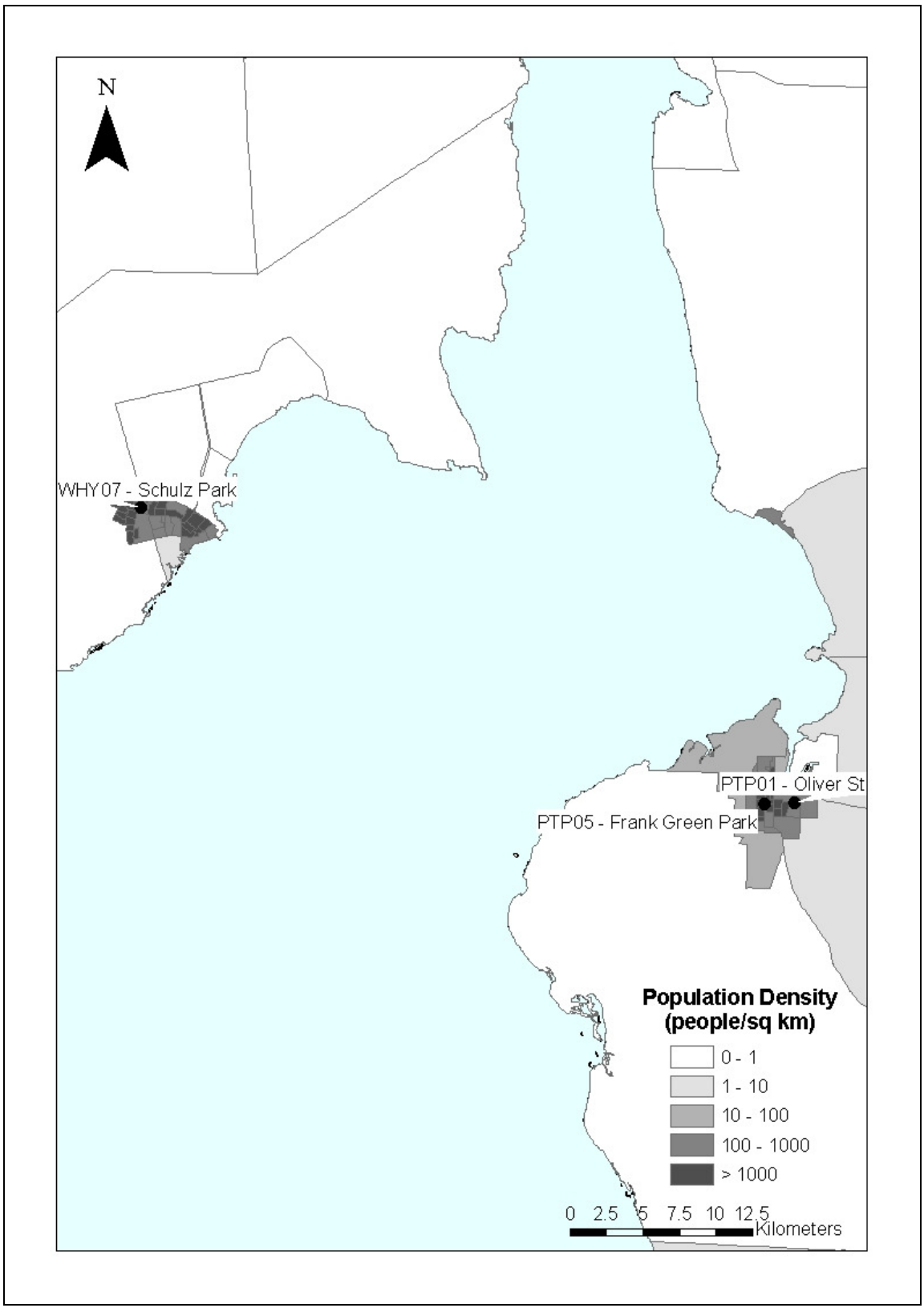

Figure 2 Spencer region and population density based on the 2006 census (Australian Bureau of Statistics 2009) with current monitoring sites.

SECTION B - ASSESSMENT OF COMPLIANCE WITH STANDARDS AND 2009 GOAL

Tables 4 to 10 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 2009 (NEPC, 1998).

Performance is assessed as meeting the standards and 2009 goal if the number of exceedances 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).

PM_{10} data reported as 'TEOM data' indicate data which has undergone an internal correction factor for US EPA equivalency and without subsequent treatment, as specified in Option 4 of PRC technical paper No 10 – Collection and reporting of TEOM PM_{10} Data (NEPM PRC, 2001).

The TEOM at Kensington became inoperable in late November 2009. Data analysis has revealed that the site is redundant and a future closure is planned.

Carbon monoxide

Table 4 2009 compliance summary for CO in South Australia

AAQ NEPM Standard 9.0 ppm (8-hr average)

Region	Data availability rates (% hours)					Number of exceedances (days)	Performance against the standards and goal
performance monitoring station/s	Q1	Q2	Q3	Q4	Annual		
Adelaide							
ELI01-Elizabeth Downs	100	100	100	99	100	0	Met

Nitrogen dioxide

Table 5 2009 compliance summary for NO_2 in South Australia

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

Region performance monitoring station/s	Data availability rates (% of hours)					Number of exceedances (days)	Annual mean (ppm)	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual			1-hour	1-year
Adelaide									
ELI01 - Elizabeth Downs	97	97	97	98	97	0	0.003	Met	Met
NOR01 - Northfield	96	98	95	97	97	0	0.006	Met	Met
NET01 - Netley	96	98	98	98	97	0	0.008	Met	Met
KEN01 - Kensington Gardens	97	98	98	97	98	0	0.004	Met	Met
CHD01 - Christie Downs	94	98	88	83	91	0	0.006	Met	Met

Ozone

Table 6 2009 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 exceedances (days)		Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual	1-hour	4-hour	1-hour	4-hour
Adelaide									
ELI01 - Elizabeth Downs	97	98	97	98	98	0	0	Met	Met
NOR01 - Northfield	97	98	95	97	97	0	0	Met	Met
NET01 - Netley	97	98	98	97	97	0	0	Met	Met
KEN01 - Kensington Gardens	97	98	98	98	98	0	0	Met	Met
CHD01 - Christie Downs	94	98	88	92	93	0	0	Met	Met

Sulfur dioxide

Table 7 2009 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 exceedances (days)		Annual 1-hour mean (ppm)	Performance against the standards and goal		
	Q1	Q2	Q3	Q4	Annual	1-hr	24-hrs		1-hr	24-hrs	1-yr
Adelaide											
NOR01 - Northfield	98	98	95	97	97	0	0	0.000	Met	Met	Met
Spencer											
PTP01 - Pt Pirie Oliver Street	98	98	98	98	98	29	2	0.009	Not Met	Not Met	Met

Particulate matter as PM_{10}

Table 8 2009 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)					Number of exceedances (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Adelaide							
ELI01 - Elizabeth Downs	96	95	99	99	97	12	Not Met
KEN01 - Kensington Gardens	96	100	100	42	84	2	Not Demonstrated
NET01 - Netley	96	100	100	100	99	5	Met
CHD01 - Christie Downs	89	100	92	100	95	2	Met
Spencer							
WHY07 - Whyalla Schulz Park	88	99	99	100	96	10	Not Met
PTP01 - Pt Pirie Oliver Street	92	100	98	100	98	14	Not Met

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Technical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Lead

Table 9 2009 compliance summary for Lead in South Australia

AAQ NEPM Standard 0.50 µg/m^3 (1-yr average)

Region performance monitoring station/s	Data availability rates (% of days)					Annual mean (µg/m^3)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Spencer							
PTP05 - Pt Pirie Frank Green Park	100	100	100	100	100	0.19	Met
PTP01 - Pt Pirie Oliver Street	98	100	100	100	100	0.40	Met

Lead data is reported to ambient conditions and analyses were carried out by NATA accredited facilities at the Queensland Health Scientific Services laboratory.

Particulate matter as $PM_{2.5}$

Table 10 2009 compliance summary for $PM_{2.5}$ in South Australia

AAQ NEPM Advisory Reporting Standard 25 µg/m^3 (24-hr average), 8 µg/m^3 (1-yr average)

Region performance monitoring station/s	Data availability rates (% of days)					Annual Mean (µg/m^3)	Annual 24hr Maximum (µg/m^3)	Performance against the standards and goal	
								24 Hour	Annual
	Q1	Q2	Q3	Q4	Annual				
Adelaide									
NET01 Netley	98	81	63	100	86	**8.1**	26.8	Not Met	Not Met

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Technical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

SECTION C - ANALYSIS OF AIR QUALITY MONITORING

Progress Towards Achieving the AAQ NEPM 2009 Goal

As assessed against the National Environment Protection (Ambient Air Quality) Measure (NEPC, 1998), the following observations were made for 2009:

- For CO, the standard and goal was met at the Elizabeth station
- For NO_2, the standards and goals were met at all stations
- For O_3, the 1 and 4-hour standards and goals were met at all stations.
- For SO_2 the 24-hour standard and goal was met at Northfield but not met at Port Pirie, Oliver Street. The annual standard and goal were met at both sites.
- For PM_{10} in the Adelaide region, the standard was exceeded on twelve occasions at the Elizabeth station; two occasions at the Kensington station; two occasions at the Christie Downs station and on five occasions at the Netley station. For the Spencer region, the standard was not met on six occasions at Whyalla, Schulz Park and on fourteen occasions at Port Pirie, Oliver Street. The goal was met at Netley and Christie Downs Stations for this reporting period.
- For Pb, the annual standard and goal were met at Frank Green Park and Oliver Street monitoring sites.
- For $PM_{2.5}$ at Netley the 24-hour advisory reporting standard and the annual standard were not met.

Circumstances which led to Exceedances

Exceedances 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 11 and 12 below summarise dates and times of exceedances occurring during the 2009 reporting year.

Exceedances of the SO_2 standard and goal occurred at Port Pirie. These exceedances were due to emissions from a major lead and zinc smelter located within the region, coupled with suitable meteorological conditions. Table 13 summarises dates and times of exceedances occurring during the 2009 reporting year.

Table 11 Summary of PM_{10} exceedances in the Spencer region with corresponding data from other site during 2009

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

Date of Exceedance (dd/mm/yyyy)	Spencer Region			
	WHY07 - Whyalla Schulz Park	Inferred Cause	PTP01 - Pt Pirie Oliver Street	Inferred Cause
20/01/2009	No data		**56.4μg/m^3**	Local dust
01/02/2009	**52.6μg/m^3**	Local dust	41.2μg/m^3	
07/02/2009	No data		**147.0μg/m^3**	Windblown dust
13/02/2009	**56.5μg/m^3**	Windblown dust	45.5μg/m^3	
14/02/2009	**84.7μg/m^3**	Windblown dust	**58.9μg/m^3**	Windblown dust
17/02/2009	**52.7μg/m^3**	Industry	**56.4μg/m^3**	Local dust
03/03/2009	28.4μg/m^3		**65.9μg/m^3**	Local dust
01/04/2009	**51.3μg/m^3**	Industry	41.9μg/m^3	
23/05/2009	28.1μg/m^3		**54.4μg/m^3**	Local dust
15/08/2009	36.3μg/m^3		**55.7μg/m^3**	Industry
11/09/2009	**54.0μg/m^3**	Local dust	**97.9μg/m^3**	Industry
12/09/2009	**141.6μg/m^3**	Local dust	**183.0μg/m^3**	Industry
16/09/2009	**141.5μg/m^3**	Local dust	**96.9μg/m^3**	Local dust
30/09/2009	**283.8μg/m^3**	Windblown dust	No data	
30/10/2009	33.3μg/m^3		**53.3μg/m^3**	Local dust
18/11/2009	30.9μg/m^3		**54.6μg/m^3**	Local dust
19/11/2009	48.1μg/m^3		**57.3μg/m^3**	Industry
31/12/2009	**57.6μg/m^3**	Windblown dust	**133.5μg/m^3**	Windblown dust

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Technical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Table 12 Summary of PM_{10} exceedences in the Adelaide region during 2009 with corresponding data from other sites

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

Date of Exceedance (dd/mm/yyyy)	Adelaide Region				
	CHD01	ELI01	KEN01	NET01	Inferred Cause
13/01/2009	41.9μg/m^3	46.8μg/m^3	31.5μg/m^3	**70.7μg/m^3**	Windblown dust
14/01/2009	22.0μg/m^3	**55.0μg/m^3**	31.3μg/m^3	29.0μg/m^3	Windblown dust
22/01/2009	40.8μg/m^3	**58.7μg/m^3**	38.1μg/m^3	49.1μg/m^3	Windblown dust
31/01/2009	No data	**62.1μg/m^3**	43.9μg/m^3	41.4μg/m^3	Windblown dust
07/02/2009	No data	**197.5μg/m^3**	**52.1μg/m^3**	**108.7μg/m^3**	Windblown dust
16/02/2009	40.4μg/m^3	**53.2μg/m^3**	41.1μg/m^3	47.8μg/m^3	Windblown dust
27/02/2009	34.8μg/m^3	**60.4μg/m^3**	33.9μg/m^3	39.6μg/m^3	Windblown dust
21/03/2009	39.8μg/m^3	**53.2μg/m^3**	34.3μg/m^3	37.7μg/m^3	Windblown dust
02/04/2009	28.4μg/m^3	**50.9μg/m^3**	30.8μg/m^3	36.1μg/m^3	Windblown dust
23/04/2009	42.7μg/m^3	**50.4μg/m^3**	31.0μg/m^3	45.1μg/m^3	Windblown dust
30/09/2009	**55.8μg/m^3**	**70.9μg/m^3**	**68.1μg/m^3**	**57.7μg/m^3**	Windblown dust
19/11/2009	32.7μg/m^3	42.6μg/m^3	No data	**59.0μg/m^3**	Windblown dust
16/12/2009	30.5μg/m^3	**53.4μg/m^3**	No data	40.6μg/m^3	Windblown dust
31/12/2009	**83.9μg/m^3**	**71.5μg/m^3**	No data	**80.4μg/m^3**	Windblown dust

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Technical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Table 13 Summary of SO_2 exceedances during 2009 in South Australia

AAQ NEPM Standard 0.20 ppm (1-hr average)

Date of Exceedance (dd/mm/yyyy)	Spencer Region	
	PTP01 - Pt Pirie Oliver Street	Inferred Cause
13/01/2009 15:00	0.284ppm	Industry with suitable wind direction
19/01/2009 16:00	0.225 ppm	As above
23/01/2009 13:00	0.202 ppm	As above
25/01/2009 10:00	0.316 ppm	As above
06/02/2009 11:00	0.201 ppm	As above
06/02/2009 12:00	0.235 ppm	As above
06/02/2009 17:00	0.216 ppm	As above
06/02/2009 18:00	0.360 ppm	As above
26/02/2009 13:00	0.356 ppm	As above
26/02/2009 16:00	0.226 ppm	As above
26/02/2009 17:00	0.368 ppm	As above
20/03/2009 17:00	0.416 ppm	As above
31/03/2009 13:00	0.210 ppm	As above
01/04/2009 14:00	0.203 ppm	As above
02/04/2009 06:00	0.692 ppm	As above
02/04/2009 07:00	1.260 ppm	As above
02/04/2009 11:00	0.297 ppm	As above
11/04/2009 12:00	0.291 ppm	As above
20/04/2009 13:00	0.233 ppm	As above
31/05/2009 15:00	0.225 ppm	As above
03/06/2009 14:00	0.342 ppm	As above
06/07/2009 13:00	0.345 ppm	As above
06/07/2009 14:00	0.230 ppm	As above
07/07/2009 15:00	0.225 ppm	As above
04/08/2009 12:00	0.239 ppm	As above
05/09/2009 12:00	0.497 ppm	As above

Date of Exceedance (dd/mm/yyyy)	Spencer Region	
	PTP01 - Pt Pirie Oliver Street	Inferred Cause
05/09/2009 15:00	0.215 ppm	Industrial source with suitable wind direction
10/09/2009 13:00	0.202 ppm	As above
10/09/2009 14:00	0.282 ppm	As above
10/09/2009 16:00	0.213 ppm	As above
14/09/2009 13:00	0.282 ppm	As above
15/09/2009 13:00	0.309 ppm	As above
15/09/2009 15:00	0.531 ppm	As above
15/09/2009 16:00	0.270 ppm	As above
18/09/2009 13:00	0.201 ppm	As above
28/09/2009 16:00	0.367 ppm	As above
28/09/2009 17:00	0.203 ppm	As above
10/10/2009 13:00	0.245 ppm	As above
10/10/2009 14:00	0.450 ppm	As above
29/10/2009 09:00	0.319 ppm	As above
29/10/2009 10:00	0.291 ppm	As above
29/10/2009 11:00	0.203 ppm	As above
29/10/2009 12:00	0.240 ppm	As above
29/10/2009 13:00	0.352 ppm	As above
29/10/2009 14:00	0.238 ppm	As above
29/10/2009 18:00	0.266 ppm	As above
09/11/2009 10:00	0.218 ppm	As above
06/12/2009 10:00	0.287 ppm	As above
06/12/2009 11:00	0.366 ppm	As above
15/12/2009 17:00	0.224 ppm	As above
20/12/2009 10:00	0.338 ppm	As above
20/12/2009 11:00	0.633 ppm	As above

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

Annual summary statistics described in Tables 14 to 21 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 14 2009 summary statistics for daily peak 8-hour CO in South Australia

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

Region & Station/s	Number of valid days	Highest (ppm)	Highest (dd mon hh:mm)	2nd highest (ppm)	2nd highest (dd mon hh:mm)
Adelaide					
ELI01 - Elizabeth	363	0.43	15 Jul 02:00	0.41	15 Jul 01:00

Nitrogen dioxide

Table 15 2009 summary statistics for daily peak 1-hour NO_2 in South Australia

AAQ NEPM Standard 0.12 ppm (1-hr average)

Region & Station/s	Number of valid days	Highest (ppm)	Highest (dd mon hh:mm)	2nd highest (ppm)	2nd highest (dd mon hh:mm)
Adelaide					
ELI01 - Elizabeth	355	0.028	07 Aug 19:00 9 Sep 19:00 30 Sep 19:00	0.027	13 Apr 21:00 15 Apr 20:00
CHD01 – Christie Downs	340	0.043	20 Apr 19:00	0.041	22 Apr 19:00
KEN01 – Kensington	365	0.039	12 Nov 10:00	0.035	12 Nov 09:00
NET01 - Netley	365	0.050	27 Jan 09:00	0.046	27 Jan 07:00
NOR01 - Northfield	364	0.042	20 Apr 19:00	0.036	13 Mar 21:00 12 Nov 09:000

Ozone

Table 16 2009 summary statistics for daily peak 1-hour O_3 in South Australia

AAQ NEPM Standard 0.10 ppm (1-hr average)

Region & Station/s	Number of valid days	Highest (ppm)	Highest (dd mon hh:mm)	2nd highest (ppm)	2nd highest (dd mon hh:mm)
Adelaide					
ELI01 - Elizabeth	365	0.073	1 Feb 14:00 1 Feb 17:00	0.069	12 Nov 12:00
CHD01 – Christie Downs	348	0.066	19 Nov 12:00	0.065	19 Nov 13:00
KEN01 - Kensington	365	0.082	14 Nov 12:00	0.073	12 Nov 12:00
NET01 - Netley	365	0.070	19 Nov 12:00	0.066	19 Nov 13:00
NOR01 - Northfield	364	0.081	14 Nov 12:00	0.075	01 Feb 14:00

Table 17 2009 summary statistics for daily peak 4-hour O_3 in South Australia

AAQ NEPM Standard 0.08 ppm (4-hr average)

Region & Station/s	Number of valid days	Highest (ppm)	Highest (dd mon hh:mm)	2nd highest (ppm)	2nd highest (dd mon hh:mm)
Adelaide					
ELI01 - Elizabeth	365	0.070	01 Feb 17:00	0.061	1 Feb 15:00 1 Feb 19:00 12 Nov 13:00
CHD01 – Christie Downs	348	0.056	12 Nov 15:00	0.055	12 Nov 14:00 19 Nov 14:00
KEN01 - Kensington	365	0.066	14 Nov 13:00	0.064	14 Nov 14:00
NET01 - Netley	365	0.062	12 Nov 15:00	0.060	12 Nov 14:00
NOR01 - Northfield	364	0.064	01 Feb 16:00	0.063	1 Feb 15:00

Sulfur dioxide

Table 18 2009 summary statistics for daily peak 1-hour SO_2 in South Australia

AAQ NEPM Standard 0.20 ppm (1-hr average)

Region & Station/s	Number of valid days	Highest (ppm)	Highest (dd mon hh:mm)	2nd highest (ppm)	2nd highest (dd mon hh:mm)
Adelaide					
NOR01 - Northfield	364	0.022	30 Jan 12:00	0.009	25 Jun 16:00
Spencer					
PTP01 – Pt Pirie Oliver St	365	**1.260**	**02 Apr 07:00**	**0.692**	**02 Apr 06:00**

Table 19 2009 summary statistics for daily peak 24-hour SO_2 in South Australia

AAQ NEPM Standard 0.08 ppm (24-hr average)

Region & Station/s	Number of valid days	Highest (ppm)	Highest (dd mon)	2nd highest (ppm)	2nd highest (dd mon)
Adelaide					
NOR01 - Northfield	361	0.002	30 Jan 25 Jun 25 Jul	0.001	29 Jan / 13 Apr 05 Jun / 13 Jun 16 Jun / 29 Jun 30 Jun / 15 Jul 24 Jul / 26 Jul 05 Aug / 09 Aug 13 Aug / 14 Aug 18 Aug / 19 Aug 28 Aug / 11 Nov 20 Nov / 09 Dec 18 Dec / 26 Dec
Spencer					
PTP01 – Pt Pirie Oliver St	365	**0.104**	**02 Apr**	**0.085**	**29 Oct**

Particulate matter as PM_{10}

Table 20 2009 summary statistics for 24-hour PM_{10} in South Australia

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

Region & Station/s	Number of valid days	Highest (ppm)	Highest (dd mon)	6th highest (µg/m^3)	6th highest (dd mon)
Adelaide					
ELI01 - Elizabeth	354	**197.5**	**7 Feb**	**58.7**	**22 Jan**
CHD01 – Christie Downs	348	**83.9**	**31 Dec**	44.8	15 Aug
KEN01 - Kensington	308	**68.1**	**30 Sep**	40.1	14 Feb
NET01 - Netley	361	**108.7**	**7 Feb**	**49.1**	**22 Jan**
Spencer					
PTP01 – Pt Pirie Oliver St	356	**183.0**	**12 Sep**	**65.9**	**3 Mar**
WHY07 – Whyalla Schulz Park	352	**283.8**	**30 Sep**	**56.5**	**13 Feb**

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Tech nical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Particulate matter as $PM_{2.5}$

Table 21 2009 summary statistics for 24-hour $PM_{2.5}$ in South Australia

AAQ NEPM Advisory Reporting Standard 25 µg/m^3 (24-hr average)

Region & Station/s	Number of valid days	Highest (ppm)	Highest (dd mon)	6th highest (µg/m^3)	6th highest (dd mon)
Adelaide					
NET01 Netley	312	**26.8**	**16 Feb**	15.8	17 Feb

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Technical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

SECTION D - DATA ANALYSIS

Tables 22-50 provide results of additional analyses of daily peak values, including percentiles of daily peak concentrations. Where available, trend data has been included. Percentile data for 2002 has been calculated from daily maxima as required in PRC technical paper number 8 (2002).

Carbon monoxide

Carbon monoxide levels have been steadily decreasing over the past 5 years

Table 22 Percentiles of daily peak 8-hour CO concentrations for Adelaide, ELI01 – Elizabeth Downs (2002 - 2009)

AAQ NEPM Standard 9.0 ppm (8-hr average)

Year yyyy	Data availability (% of days)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	84	0.8	0.7	0.6	0.4	0.3	0.2	0.1
2003	92	1.4	0.8	0.7	0.5	0.4	0.2	0.1
2004	98	0.8	0.6	0.5	0.4	0.3	0.2	0.1
2005	94	0.8	0.6	0.4	0.4	0.3	0.1	0.1
2006	86	0.7	0.5	0.4	0.3	0.2	0.1	0.0
2007	100	0.6	0.4	0.3	0.3	0.2	0.1	0.0
2008	96	0.5	0.4	0.3	0.3	0.2	0.1	0.0
2009	100	0.4	0.3	0.3	0.2	0.2	0.1	0.1

Nitrogen dioxide

Nitrogen oxide levels showed a decrease initially, but have stayed steady over the last 5 years.

Table 23 Percentiles of daily peak 1-hour NO_2 concentrations for ELI01-Elizabeth Downs (2002-2009)

AAQ NEPM Standard 0.12 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	94	0.040	0.034	0.033	0.029	0.026	0.022	0.014
2003	97	0.043	0.030	0.028	0.025	0.022	0.019	0.011
2004	95	0.037	0.031	0.029	0.025	0.023	0.019	0.012
2005	95	0.038	0.031	0.028	0.025	0.023	0.019	0.011
2006	89	0.043	0.030	0.029	0.026	0.023	0.017	0.011
2007	94	0.039	0.026	0.025	0.023	0.021	0.017	0.011
2008	93	0.031	0.027	0.020	0.024	0.023	0.018	0.011
2009	97	0.028	0.027	0.026	0.024	0.022	0.017	0.010

Table 24 Percentiles of daily peak 1-hour NO_2 concentrations for NOR01-Northfield (2002 - 2009)

AAQ NEPM Standard 0.12 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	94	0.047	0.038	0.033	0.031	0.028	0.024	0.018
2003	95	0.039	0.035	0.032	0.031	0.028	0.024	0.017
2004	96	0.045	0.038	0.033	0.029	0.026	0.023	0.017
2005	94	0.039	0.035	0.033	0.030	0.028	0.024	0.018
2006	93	0.034	0.031	0.030	0.028	0.025	0.021	0.016
2007	96	0.037	0.034	0.032	0.029	0.027	0.023	0.017
2008	97	0.041	0.035	0.034	0.030	0.028	0.025	0.017
2009	97	0.041	0.034	0.031	0.028	0.027	0.023	0.017

Table 25 Percentiles of daily peak 1-hour NO_2 concentrations for NET01-Netley (2002 - 2009)

AAQ NEPM Standard 0.12 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	84	0.050	0.042	0.037	0.035	0.032	0.028	0.023
2003	97	0.039	0.036	0.035	0.032	0.029	0.026	0.021
2004	96	0.103	0.041	0.038	0.034	0.030	0.026	0.021
2005	97	0.051	0.042	0.037	0.034	0.031	0.028	0.022
2006	95	0.054	0.037	0.036	0.033	0.030	0.027	0.021
2007	97	0.040	0.038	0.036	0.032	0.030	0.028	0.023
2008	97	0.047	0.040	0.039	0.035	0.031	0.027	0.022
2009	98	0.050	0.029	0.027	0.024	0.020	0.012	0.005

Table 26 Percentiles of daily peak 1-hour NO_2 concentrations for KEN01-Kensington Gardens (2002 - 2009)

AAQ NEPM Standard 0.12 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	94	0.041	0.030	0.030	0.028	0.025	0.022	0.015
2003	97	0.040	0.034	0.031	0.026	0.024	0.021	0.014
2004	96	0.037	0.032	0.028	0.025	0.023	0.019	0.013
2005	97	0.031	0.029	0.027	0.026	0.024	0.019	0.013
2006	96	0.037	0.028	0.027	0.025	0.022	0.018	0.013
2007	94	0.035	0.030	0.029	0.026	0.023	0.020	0.014
2008	95	0.032	0.028	0.027	0.025	0.023	0.019	0.012
2009	98	0.039	0.028	0.028	0.025	0.023	0.018	0.012

Table 27 Percentiles of daily peak 1-hour NO_2 concentrations for CHD01-Christie Downs (2006 - 2009)

AAQ NEPM Standard 0.12 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2006	69	0.033	0.024	0.023	0.020	0.016	0.008	0.003
2007	97	0.038	0.031	0.030	0.027	0.025	0.020	0.013
2008	95	0.036	0.033	0.031	0.028	0.026	0.021	0.013
2009	91	0.043	0.035	0.032	0.027	0.026	0.022	0.013

Ozone

Table 28 Percentiles of daily peak 1-hour O_3 concentrations for ELI01-Elizabeth Downs (2002 – 2009)

AAQ NEPM Standard 0.10 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	95	0.072	0.062	0.053	0.045	0.040	0.033	0.030
2003	97	0.077	0.064	0.059	0.050	0.042	0.034	0.029
2004	96	0.088	0.065	0.055	0.046	0.041	0.033	0.029
2005	97	0.062	0.057	0.050	0.041	0.036	0.032	0.029
2006	90	0.072	0.061	0.055	0.051	0.040	0.035	0.029
2007	98	0.082	0.070	0.065	0.051	0.045	0.035	0.030
2008	97	0.097	0.059	0.055	0.042	0.039	0.033	0.030
2009	98	0.073	0.047	0.043	0.038	0.033	0.027	0.023

Table 29 Percentiles of daily peak 1-hour O_3 concentrations for NOR01-Northfield (2002 – 2009)

AAQ NEPM Standard 0.10 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	98	0.080	0.060	0.051	0.045	0.040	0.033	0.029
2003	97	0.068	0.060	0.054	0.047	0.042	0.033	0.028
2004	94	0.081	0.065	0.058	0.045	0.040	0.033	0.028
2005	94	0.060	0.049	0.045	0.040	0.036	0.031	0.028
2006	95	0.067	0.053	0.050	0.043	0.038	0.031	0.027
2007	97	0.069	0.060	0.054	0.047	0.042	0.033	0.029
2008	97	0.074	0.054	0.048	0.042	0.038	0.032	0.028
2009	97	0.081	0.059	0.056	0.047	0.042	0.032	0.027

Table 30 Percentiles of daily peak 1-hour O_3 concentrations for NET01-Netley (2002 – 2009)

AAQ NEPM Standard 0.10 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	98	0.087	0.056	0.048	0.042	0.037	0.031	0.028
2003	97	0.069	0.059	0.054	0.045	0.039	0.032	0.027
2004	98	0.067	0.056	0.049	0.044	0.037	0.032	0.028
2005	97	0.079	0.054	0.049	0.041	0.037	0.032	0.028
2006	95	0.105	0.058	0.054	0.043	0.038	0.031	0.028
2007	97	0.077	0.055	0.052	0.046	0.040	0.033	0.029
2008	97	0.071	0.056	0.047	0.041	0.037	0.032	0.029
2009	97	0.070	0.043	0.039	0.033	0.030	0.025	0.019

Table 31 Percentiles of daily peak 1-hour O_3 concentrations for KEN01-Kensington Gardens (2002 – 2009)

AAQ NEPM Standard 0.10 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	96	0.086	0.057	0.053	0.046	0.042	0.035	0.030
2003	97	0.074	0.065	0.058	0.049	0.042	0.034	0.029
2004	97	0.078	0.067	0.062	0.047	0.041	0.033	0.029
2005	98	0.061	0.053	0.051	0.044	0.039	0.034	0.031
2006	96	0.090	0.061	0.057	0.048	0.040	0.033	0.029
2007	96	0.076	0.062	0.058	0.051	0.045	0.034	0.030
2008	95	0.072	0.059	0.053	0.044	0.039	0.033	0.029
2009	98	0.082	0.060	0.058	0.047	0.040	0.032	0.027

Table 32 Percentiles of daily peak 1-hour O_3 concentrations for CHD01-Christie Downs (2006 - 2009)

AAQ NEPM Standard 0.10 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2006	66	0.055	0.050	0.046	0.040	0.037	0.033	0.030
2007	97	0.074	0.054	0.053	0.046	0.040	0.034	0.030
2008	96	0.068	0.052	0.046	0.041	0.038	0.032	0.029
2009	93	0.066	0.041	0.037	0.033	0.030	0.025	0.020

Table 33 Percentiles of daily peak 4-hour rolling O_3 concentrations for ELI01-Elizabeth Downs (2002 – 2009)

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

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	96	0.057	0.046	0.044	0.039	0.037	0.032	0.029
2003	99	0.063	0.056	0.052	0.045	0.040	0.032	0.028
2004	98	0.079	0.056	0.051	0.042	0.037	0.032	0.027
2005	99	0.056	0.049	0.044	0.038	0.034	0.030	0.028
2006	92	0.065	0.051	0.049	0.045	0.038	0.033	0.028
2007	100	0.078	0.063	0.056	0.048	0.042	0.033	0.029
2008	99	0.086	0.051	0.048	0.041	0.037	0.032	0.028
2009	100	0.070	0.046	0.042	0.037	0.032	0.027	0.023

Table 34 Percentiles of daily peak 4-hour rolling O_3 concentrations for NOR01-Northfield (2002 – 2009)

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

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	99	0.064	0.052	0.046	0.041	0.036	0.031	0.028
2003	100	0.061	0.053	0.047	0.044	0.038	0.031	0.027
2004	96	0.067	0.058	0.049	0.041	0.038	0.032	0.027
2005	96	0.054	0.046	0.041	0.036	0.035	0.030	0.027
2006	97	0.058	0.048	0.045	0.040	0.035	0.030	0.026
2007	100	0.059	0.054	0.052	0.044	0.040	0.032	0.028
2008	100	0.068	0.049	0.045	0.039	0.035	0.031	0.027
2009	99	0.064	0.054	0.051	0.043	0.039	0.030	0.026

Table 35 Percentiles of daily peak 4-hour rolling O_3 concentrations for NET01-Netley (2002 – 2009)
AAQ NEPM Standard 0.08 ppm (4-hr rolling average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	99	0.071	0.050	0.044	0.038	0.034	0.030	0.027
2003	99	0.060	0.053	0.047	0.042	0.037	0.030	0.027
2004	100	0.059	0.048	0.044	0.040	0.036	0.031	0.027
2005	99	0.072	0.048	0.044	0.038	0.034	0.030	0.027
2006	97	0.094	0.052	0.047	0.041	0.036	0.030	0.027
2007	100	0.070	0.051	0.050	0.044	0.038	0.032	0.028
2008	99	0.061	0.049	0.043	0.039	0.036	0.031	0.027
2009	99	0.062	0.042	0.038	0.033	0.030	0.025	0.018

Table 36 Percentiles of daily peak 4-hour rolling O_3 concentrations for KEN01-Kensington Gardens (2002 – 2009)

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

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	97	0.073	0.051	0.047	0.041	0.038	0.033	0.029
2003	99	0.071	0.054	0.051	0.045	0.040	0.032	0.028
2004	99	0.071	0.059	0.054	0.043	0.038	0.031	0.028
2005	100	0.055	0.050	0.044	0.040	0.037	0.032	0.029
2006	99	0.072	0.055	0.051	0.044	0.039	0.032	0.028
2007	98	0.063	0.058	0.054	0.047	0.043	0.033	0.029
2008	97	0.067	0.055	0.048	0.042	0.037	0.031	0.028
2009	99	0.066	0.054	0.051	0.043	0.038	0.030	0.026

Table 37 Percentiles of daily peak 4-hour rolling O_3 concentrations for CHD01-Christie Downs (2006 - 2009)

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

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2006	66	0.049	0.047	0.042	0.038	0.035	0.032	0.029
2007	98	0.060	0.052	0.050	0.044	0.038	0.033	0.029
2008	98	0.060	0.047	0.044	0.038	0.036	0.031	0.027
2009	95	0.056	0.040	0.037	0.032	0.030	0.025	0.020

Sulfur dioxide

Sulfur dioxide levels, particularly in the Spencer Gulf region, have increased over the past 5 years

Table 38 Percentiles of daily peak 1-hour SO_2 concentrations for Adelaide, NOR01-Northfield (2002 – 2009)

AAQ NEPM Standard 0.20 ppm (1-hr average)

Year yyyy	Data availability (% of hours)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	15	0.027	0.024	0.020	0.013	0.010	0.005	0.003
2003	95	0.009	0.007	0.006	0.005	0.004	0.002	0.001
2004	93	0.012	0.007	0.006	0.004	0.003	0.001	0.001
2005	93	0.015	0.008	0.006	0.004	0.003	0.001	0.001
2006	94	0.020	0.005	0.004	0.003	0.002	0.002	0.001
2007	96	0.008	0.006	0.005	0.003	0.002	0.001	0.001
2008	97	0.009	0.006	0.00	0.004	0.002	0.001	0.001
2009	97	0.022	0.006	0.005	0.003	0.002	0.001	0.000

Table 39 Percentiles of daily peak 1-hour SO_2 concentrations for the Spencer Gulf, PTP01-Pt Pirie Oliver Street (2003 – 2009)

AAQ NEPM Standard 0.20 ppm (1-hr average)

Year yyyy	Data availability (% of hours)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	51	0.656	0.400	0.302	0.257	0.186	0.095	0.028
2003	96	0.487	0.388	0.309	0.221	0.152	0.070	0.023
2004	97	0.440	0.356	0.335	0.260	0.185	0.078	0.020
2005	94	0.721	0.391	0.362	0.234	0.186	0.105	0.042
2006	96	0.485	0.361	0.311	0.240	0.191	0.092	0.018
2007	97	0.594	0.404	0.312	0.249	0.175	0.101	0.029
2008	97	0.522	0.421	0.330	0.258	0.185	0.108	0.033
2009	98	**1.260**	0.151	0.094	0.045	0.018	0.002	0.002

Table 40 Percentiles of 24-hour SO_2 concentrations for Adelaide, NOR01-Northfield (2002 – 2009)

AAQ NEPM Standard 0.08 ppm (24-hr average)

Year yyyy	Data availability (% of days)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	54	0.007	0.006	0.005	0.005	0.004	0.002	0.001
2003	99	0.003	0.002	0.002	0.002	0.001	0.001	0.000
2004	96	0.003	0.002	0.001	0.001	0.001	0.001	0.000
2005	96	0.004	0.002	0.002	0.001	0.000	0.000	0.000
2006	96	0.003	0.002	0.001	0.001	0.001	0.000	0.000
2007	99	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2008	99	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2009	99	0.002	0.001	0.001	0.001	0.000	0.000	0.000

Table 41 Percentiles of 24-hour SO_2 concentrations for the Spencer Gulf, PTP01-Pt Pirie Oliver Street (2003 – 2009)

AAQ NEPM Standard 0.08 ppm (24-hr average)

Year yyyy	Data availability (% of days)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50th
2002	52	0.050	0.045	0.040	0.035	0.029	0.013	0.005
2003	97	0.095	0.043	0.037	0.024	0.018	0.011	0.004
2004	100	0.051	0.039	0.037	0.028	0.022	0.011	0.003
2005	95	0.072	0.054	0.049	0.033	0.023	0.014	0.005
2006	98	0.053	0.043	0.040	0.032	0.023	0.013	0.002
2007	99	0.061	0.044	0.042	0.032	0.024	0.014	0.004
2008	99	0.076	0.052	0.048	0.034	0.026	0.014	0.004
2009	100	**0.104**	0.062	0.046	0.032	0.023	0.012	0.003

Particulate matter as PM_{10}

PM_{10} particle levels continue to be high this year.

Table 42 Percentiles of daily 24-hour PM_{10} concentrations for ELI01-Elizabeth Downs (2004 – 2009)

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

Year yyyy	Data availability rates (%)	Max (µg/m^3)	Percentiles (µg/m^3)					
			99th	98th	95th	90th	75th	50th
2004	55	**63.9**	39.1	33.5	26.8	22.3	16.1	12.4
2005	95	**84.8**	**58.8**	48.5	38.2	30.0	21.7	14.9
2006	92	**90.4**	49.3	44.8	30.4	23.0	17.3	13.0
2007	97	**74.9**	47.2	41.9	31.9	25.9	19.5	13.5
2008	94	**77.5**	47.4	41.8	34.5	28.5	21.5	15.9
2009	97	**197.5**	**61.2**	**53.4**	46.8	34.9	24.4	15.6

Table 43 Percentiles of daily 24-hour PM_{10} concentrations for KEN01-Kensington Gardens (2002 – 2009)

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

Year yyyy	Data availability rates (%)	Max (µg/m^3)	Percentiles (µg/m^3)					
			99th	98th	95th	90th	75th	50th
2002	47	**103.7**	34.1	27.5	24.2	22.3	18.0	14.0
2003	89	**85.9**	44.5	35.2	26.3	21.4	16.7	13.1
2004	94	**53.7**	34.0	31.4	27.5	23.2	18.2	13.0
2005	98	**76.2**	39.8	35.2	27.9	24.1	19.0	13.7
2006	95	**73.2**	41.3	36.7	26.4	22.5	17.0	12.1
2007	92	**51.1**	43.0	39.4	29.3	25.2	19.0	13.0
2008	97	**69.1**	44.5	34.0	29.0	25.5	19.3	13.5
2009	84	**68.1**	41.0	38.3	32.0	27.3	19.6	12.8

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Technical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Table 44 Percentiles of daily 24-hour PM_{10} concentrations for NET01-Netley (2002 – 2009)

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

Year yyyy	Data availability rates (%)	Max (µg/m^3)	Percentiles (µg/m^3)					
			99th	98th	95th	90th	75th	50th
2002	100	**79.3**	43.1	38.1	31.6	27.5	22.8	18.5
2003	97	**119.4**	**54.0**	46.0	33.9	29.4	22.1	17.9
2004	99	**62.7**	42.4	40.3	33.6	29.5	23.1	17.3
2005	90	**58.7**	**54.5**	48.1	38.3	32.3	24.3	17.9
2006	91	**101.4**	**85.7**	**69.2**	43.0	33.5	24.6	18.1
2007	95	**125.9**	**80.3**	**57.6**	37.6	31.0	23.3	17.6
2008	99	**90.3**	**50.5**	43.8	36.7	30.9	22.9	17.4
2009	99	**108.7**	**58.2**	45.7	39.6	30.3	22.8	16.8

Table 45 Percentiles of daily 24-hour PM_{10} concentrations for CHD01-Christie Downs (2006 - 2009)

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

Year yyyy	Data availability rates (%)	Max (µg/m^3)	Percentiles (µg/m^3)					
			99th	98th	95th	90th	75th	50th
2006	73	**52.2**	49.6	42.1	31.2	25.8	19.4	14.3
2007	93	**70.5**	43.8	38.3	31.7	27.3	21.6	15.5
2008	96	**89.7**	40.5	34.0	30.7	26.9	20.4	15.1
2009	95	**83.9**	45.8	42.8	35.9	28.7	21.1	15.9

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Technical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Table 46 Percentiles of daily 24-hour PM_{10} concentrations for WHY07-Whyalla Schulz Park (2007 - 2009)

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

Year yyyy	Data availability rates (%)	Max (µg/m^3)	Percentiles (µg/m^3)					
			99th	98th	95th	90th	75th	50th
2007	67	97.2	62.8	51.2	30.5	27.4	20.5	14.7
2008	98	**96.5**	**57.6**	45.3	36.9	32.1	23.7	15.9
2009	96	**283.8**	**70.9**	**52.7**	41.2	35.2	26.0	16.3

Table 47 Percentiles of daily 24-hour PM_{10} concentrations for PTP01-Pt Pirie Oliver Street (2002 – 2009)

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

Year yyyy	Data availability rates (%)	Max (µg/m^3)	Percentiles (µg/m^3)					
			99th	98th	95th	90th	75th	50th
2002#	16	**57.0**	**50.4**	45.1	33.4	31.3	27.8	21.2
2003	50	**60.5**	**51.7**	47.0	38.9	30.8	21.8	14.1
2004	97	**135.8**	**51.8**	43.9	35.7	28.5	22.6	15.7
2005	95	**464.3**	**68.4**	45.6	37.6	31.6	23.4	16.6
2006	96	**181.8**	**71.0**	**59.3**	42.9	34.6	25.1	17.4
2007	98	**173.8**	**68.6**	**60.8**	45.2	37.2	25.2	16.8
2008	98	**235.1**	**83.1**	**64.0**	48.9	39.5	25.3	15.5
2009	98	**183.0**	**97.4**	**57.2**	46.0	34.8	24.3	14.6

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

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Technical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Lead

Table 48 Annual Mean Lead Concentration for PTP05-Pt Pirie Frank Green Park (2002 - 2009)

AAQ NEPM Standard 0.50 µg/m^3 (annual-hr average)

Year yyyy	Data availability rate (% days)	Annual mean (µg/m^3)
2002	100	0.24
2003	100	0.23
2004	95	0.33
2005	98	0.30
2006	100	0.19
2007	100	0.21
2008	100	0.14
2009	100	0.19

Table 49 Annual Mean Lead Concentration for PTP01-Pt Pirie Oliver Street (2002 - 2009)

AAQ NEPM Standard 0.50 µg/m^3 (annual-hr average)

Year yyyy	Data availability rate (% days)	Annual mean (µg/m^3)
2002	100	0.53
2003	97	0.68
2004	95	0.68
2005	98	0.70
2006	100	0.56
2007	98	0.59
2008	95	0.41
2009	100	0.40

Lead data are reported to ambient conditions and analyses were carried out by NATA accredited facilities at the Queensland Health Scientific Services laboratory.

Particulate matter as $PM_{2.5}$

$PM_{2.5}$ particles have been at their highest since 2006 this year.

Table 50 Percentiles of daily 24-hour $PM_{2.5}$ concentrations for NET01-Netley (2004 – 2009)

AAQ NEPM Advisory Reporting Standard 25 µg/m^3 (24-hr average)

Year yyyy	Data availability rates (%)	Max (µg/m^3)	Percentiles (µg/m^3)					
			99th	98th	95th	90th	75th	50th
2005	96	17.3	16.4	15.0	13.2	11.6	9.4	7.3
2006	96	61.2	20.4	19.0	14.5	12.0	9.7	7.3
2007	99	21.9	14.4	13.5	12.3	11.3	9.3	7.6
2008	92	20.2	15.7	14.5	12.5	10.9	9.2	7.2
2009	86	**26.8**	17.9	15.2	13.5	11.9	9.6	7.6

Monitoring by Tapered Element Oscillating Microbalance (TEOM)

The SA EPA uses Section 6 Option 4 (no temperature adjustment of TEOM data) of Peer Review Committee, Technical Paper No 10 Collection and Reporting of TEOM PM_{10} Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

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Sampling and analysis methods

Carbon monoxide	AS3850.7.1 - 1992	U95= ±0.66 ppm @ 9.0 ppm
Nitrogen oxides	AS3580.5.1 – 1993	U95= ±0.045 ppm @ 0.120 ppm
Ozone	AS3580.6.1 – 1993	U95= ±0.005 ppm @ 0.100 ppm
Sulfur dioxide	AS3580.4.1 – 1990	U95= ±0.011 ppm @ 0.200 ppm
Lead*	AS2800 – 1985	**U95= ±0.09 µg/m3 @ 5 µg/m3
PM_{10}	AS3580.9.8 – 2001	U95= ±1.5 µg/m3 for 1hr average
$PM_{2.5}$	Using TEOM with PM_{10} inlet and VSCC $PM_{2.5}$ cut off	

* Analysis by Queensland Health Scientific Services, NATA accreditation # 41

** This value does not include the uncertainty of the analysis by Q.H.S.S.

Uncertainty of Measurement

The expanded uncertainties of measurements (U95) quoted above are at a confidence level of 95% with a coverage factor of 2. The values shown do not include any estimate of the effects associated with the sampling location.

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