



Air Monitoring Report for South Australia 2010

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

June 2011

**Air Monitoring Report for South Australia 2010:
Compliance with the National Environment Protection (Ambient Air Quality)
Measure, June 2011**

Principal Author: Melinda Hunt

Supporting Author: Rob Mitchell

For further information please contact:

Information Officer
Environment Protection Authority
GPO Box 2607
Adelaide SA 5001

Telephone: (08) 8204 2004
Facsimile: (08) 8204 9393
Free call (country): 1800 623 445

Web site: www.epa.sa.gov.au

E-mail: epainfo@epa.sa.gov.au

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EXECUTIVE SUMMARY

South Australia's monitoring results for 2010 indicated that:

- In 2010 the AAQ NEPM goals were met at all NEPM monitored regions in South Australia except for sulfur dioxide at Port Pirie in the Spencer region. It must be noted, however, that rainfall was higher in 2010 than in previous years and this would have affected pollutant concentrations, especially particle concentrations. The EPA conducts monitoring at non-NEPM sites not reported in this document
- High quarterly data capture rates, above 85% with annual rates in the mid to high 90s, were achieved during the 2010 reporting year.
- Air quality of the Adelaide airshed was generally good during 2010 and the AAQ NEPM goals were met for all pollutants at all five monitoring stations in this area.
- There were no exceedences of the CO, NO₂, O₃, SO₂ or PM_{2.5} standards at any of the metropolitan ambient air monitoring stations.
- There were several exceedences of the PM₁₀ standard in both the Adelaide and Spencer regions.
- In many cases pollutant levels are either remaining steady or showing possible decreasing trends. Places where pollutants could be increasing over time are NO₂ at Christie Downs; 1-hour O₃ at Netley; 4-hour O₃ at Elizabeth, Netley and Kensington; and 1-hour SO₂ at Port Pirie. PM₁₀ has increased initially at all monitored stations but levels have dropped in 2010.
- In the Spencer region the AAQ NEPM goal for PM₁₀ was met at both Whyalla and Port Pirie. The goals for SO₂ were met at Port Pirie for 1-day and 1-yr averaging periods; however the goal was not met for the 1-hour averaging period.
- The AAQ NEPM goal for lead was met at both NEPM monitoring stations in Port Pirie.
- In Port Pirie, exceedences of the 1-hour SO₂ standard were recorded on forty four occasions and on thirty five days and exceedences of the 24-hour PM₁₀ standard were recorded on three occasions.
- PM₁₀ particle monitoring has been discontinued at Kensington.
- 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 (PM₁₀ and SO₂)
 - Southern wineries (O₃, NO₂, PM₁₀, SO₂)
 - Barossa / Angaston (O₃, NO₂, PM₁₀, SO₂)
 - Riverland (O₃, NO₂, PM₁₀, SO₂)

SECTION A - MONITORING SUMMARY

Air quality in South Australia is monitored in accordance with a monitoring plan (SA EPA, 2001) developed under the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM) (NEPC, 2003). This report assesses compliance with this measure.

Current performance monitoring stations

The AAQ NEPM requires the assessment of carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), lead (Pb) and particles less than 10 micrometres effective aerodynamic diameter (PM₁₀). In 2003, the AAQ NEPM was varied to include monitoring of particles less than 2.5 micrometres effective aerodynamic diameter (PM_{2.5}) (NEPC, 2003).

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. Campaign monitoring for PM₁₀ was conducted in Mount Gambier during winter 2010 and is planned again for 2011. As this was not a full year of monitoring it has not been included in this compliance report.

Performance monitoring stations (PMS) are designated as either trend or campaign stations depending on 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. Figure 1 shows the current monitoring stations and population density in the Adelaide region and figure 2 shows current monitoring stations and population density in the Spencer region. 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 2010.

Table 1 below provides a summary of each performance monitoring station that was operating during the 2010 reporting year. Station location, type, exposed population and pollutants monitored have been included. Table 2 lists the methods used for monitoring the NEPM pollutants and Table 3 describes each station's compliance with siting criteria set out in AS/NZS 3580.1.1:2007.

NATA status

The South Australian Environment Protection Authority operates all monitoring stations described in this report. Although quality systems are in place, the EPA doesn't currently have accreditation for its laboratory.

Table 1 Summary of current performance monitoring stations in South Australia

REGION	Location category	site type	AAQ NEPM pollutants measured						
			CO	NO ₂	O ₃	SO ₂	Pb	PM ₁₀	PM _{2.5}
ADELAIDE									
ELI01 - Elizabeth Downs	Res	G/Trend	×	×	×			×	
NOR01 - Northfield	Res	G/Trend		×	×	×			
NET01 - Netley	Res/LI	G/Trend		×	×			×	×
KEN01 - Kensington Gardens	Res	G/Trend		×	×				
CHD01 - Christie Downs	Res	G/Trend		×	×			×	
SPENCER									
PTP01 - Pt Pirie Oliver Street	Res/I	G/Trend				×	×	×	
PTP05 - Pt Pirie Frank Green Park	Res/I	G/Trend					×		
WHY07 - Whyalla Schulz Park	Res/I	G/Trend						×	
	Res LI I G	Residential Light industrial Industrial Generally representative upper bound							

Table 2 Methods used for monitoring the NEPM pollutants

Pollutant		Standard	Title	Method Used
Carbon monoxide	CO	AS3580.7.1 - 1992	Determination of Carbon Monoxide-Direct Reading Instrumental method	Gas filter correlation infrared
Nitrogen dioxide	NO ₂	AS3580.5.1 - 1993	Determination of Oxides of Nitrogen - Chemiluminescence Method	Chemiluminescence
Ozone	O ₃	AS3580.6.1 - 1990	Determination of Ozone- Direct Reading Instrumental Method	Ultraviolet photometry
Sulfur dioxide	SO ₂	AS3580.4.1 - 2008	Determination of Sulfur Dioxide-Direct Reading Instrumental Method	Ultraviolet fluorescence
Particles	PM ₁₀	AS3580.9.8 - 2008	Determination of Suspended Particulate Matter- PM ₁₀ Continuous Direct Mass Method using a Tapered Element Oscillating Microbalance Analyser	TEOM
	PM _{2.5}	AS3580.9.8 - 2008	Determination of Suspended Particulate Matter- PM ₁₀ Continuous Direct Mass Method using a Tapered Element Oscillating Microbalance Analyser*	TEOM
Lead	Pb	AS/NZS3580.9.3:2003	Determination of Suspended Particulate Matter- Total Suspended Particulate Matter (TSP) - High Volume Sampler (HVS) Gravimetric Method	Gravimetric
	Pb	AS2800 - 1985	Determination of particulate lead-High Volume Sampler Gravimetric Collection- Analysis is modified to use Inductively Coupled Plasma	Sampling as per standard and analysis by inductively coupled plasma optical emission spectroscopy (ICP-OES)

* With reference to PM_{2.5} in place of PM₁₀ and minor modifications to adapt the Standard for the purposes of PM_{2.5} monitoring as set out in *Technical Paper on Monitoring for Particles as PM_{2.5}* (NEPC, 2003)

Table 3 Stations' siting compliance with AS 3580.1.1:2007

Region Station	Location Category	Comments	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
Adelaide									
ELI01 - Elizabeth Downs	Res		✓	✓	✓	✓	✗	✓	✓
NOR01 - Northfield	Res		✓	✓	✓	✓	✗	✓	✓
NET01 - Netley	Res/LI	Heavy traffic	✓	✓	✓	✓	✓	✓	✓
KEN01 - Kensington Gardens	Res	30 m-high gums @ 10 m, but clear aspect—thin, high canopy	✓	✓	✗	✗	✗	✓	✓
CHD01 - Christie Downs	Res		✓	✓	✓	✓	✓	✗	✓
Spencer									
PTP01 - Pt Pirie Oliver Street	Res/I	Type 2	✓	✓	✓	✓	✓	✓	✓
PTP05 - Pt Pirie Frank Green Park	Res/I	Type 2	✓	✓	✓	✓	✓	✓	✓
WHY07 - Whyalla Schulz Park	Res/I	Type 2	✓	✓	✓	✓	✓	✓	✓

Res- Residential

LI- Light industrial

I- Industrial

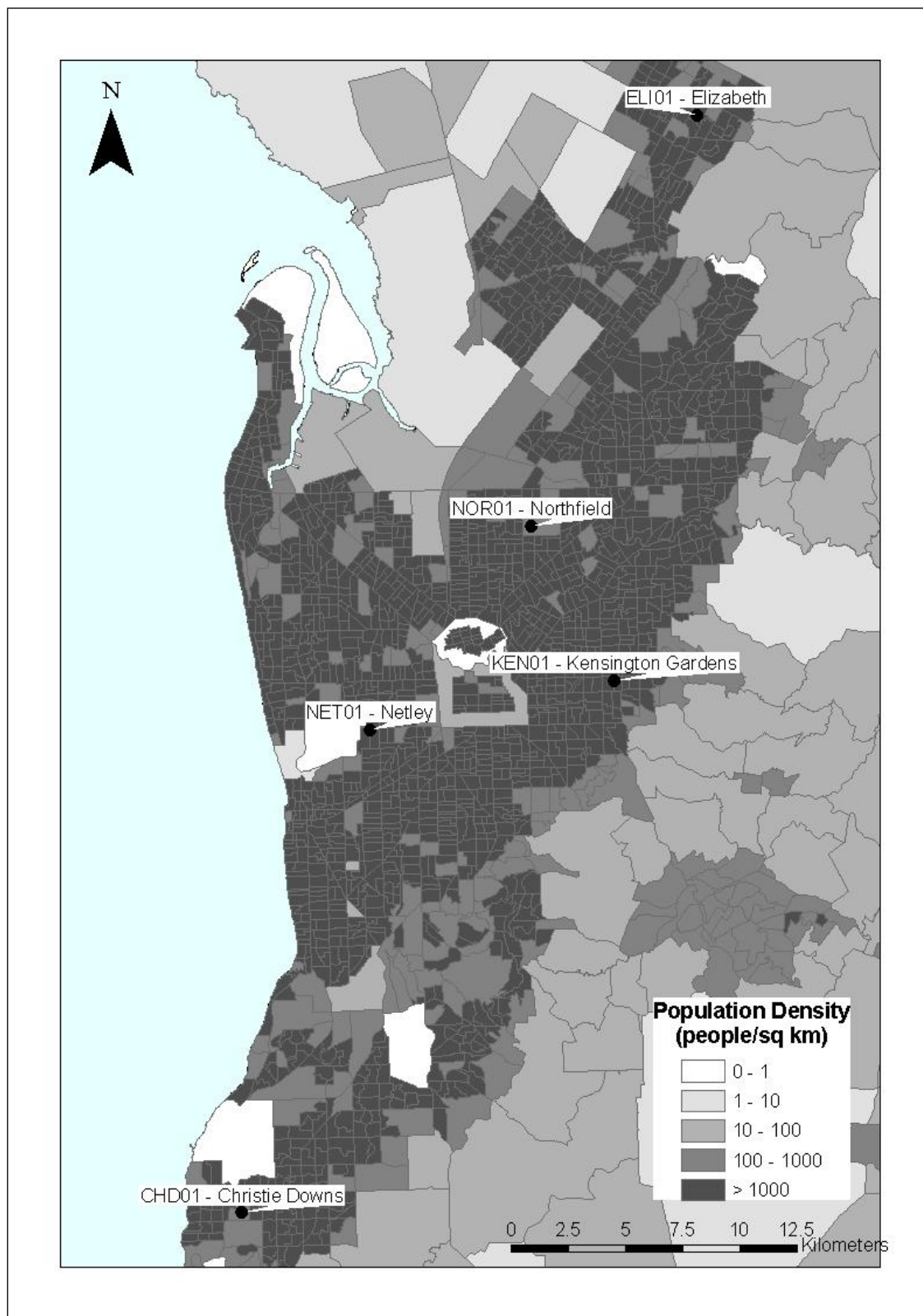


Figure 1 Population density of the Adelaide region based on the 2006 census (Australian Bureau of Statistics 2009) showing current monitoring sites.

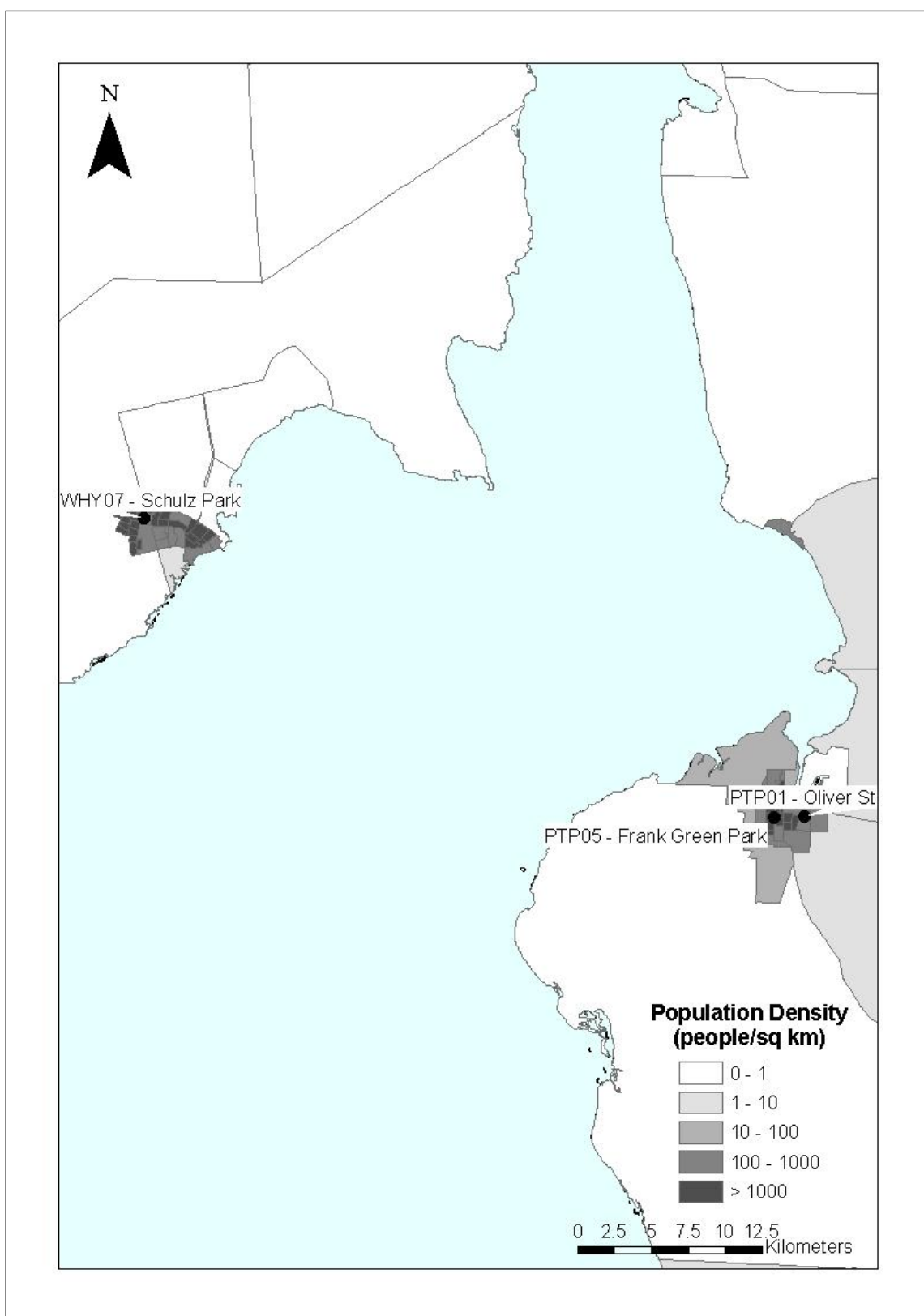


Figure 2 Population density of the Spencer region based on the 2006 census (Australian Bureau of Statistics 2009) showing current monitoring sites.

SECTION B - ASSESSMENT OF COMPLIANCE WITH STANDARDS AND 2010 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.

Performance is assessed as meeting the standards and goal if the number of exceedences of the standard is no more than the number specified in Schedule 2 of the AAQ NEPM (NEPC, 2003), and data recovery was at least 75% in each quarter of the year (NEPC PRC, 2001).

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, 2003).

Calculations and reporting methods used, comply with requirements detailed in the NEPC Peer Review Committee, Technical Paper No 8: Annual Reports (NEPC PRC, 2010).

PM₁₀ data reported as 'TEOM data' indicate data which have undergone an internal correction factor for US EPA equivalency but without subsequent treatment, as specified in Option 4 of PRC technical paper No 10 – Collection and Reporting of TEOM PM₁₀ Data (NEPC PRC, 2001).

Carbon monoxide

Table 4 2010 compliance summary for CO in South Australia

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		
Adelaide							
ELI01- Elizabeth Downs	99.6	92.1	100.0	99.6	97.8	0	met

AAQ NEPM Standard
9.0 ppm (8-hr average)

Nitrogen dioxide

Table 5 2010 compliance summary for NO₂ 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 exceedences (days)	Annual mean (ppm)	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual			1-hour	1-year
Adelaide									
ELI01 - Elizabeth Downs	93.0	90.9	97.6	97.5	94.8	0	0.004	met	met
NOR01 - Northfield	94.4	97.4	97.4	97.3	96.7	0	0.007	met	met
NET01 - Netley	94.6	88.8	85.3	96.2	91.2	0	0.008	met	met
KEN01 - Kensington Gardens	97.6	97.7	97.0	97.6	97.5	0	0.004	met	met
CHD01 - Christie Downs	94.6	90.0	95.0	85.7	91.3	0	0.005	met	met

Ozone

Table 6 2010 compliance summary for O₃ 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									
ELI01 - Elizabeth Downs	97.6	97.9	97.8	97.5	97.7	0	0	met	met
NOR01 - Northfield	94.8	97.6	97.9	97.5	96.9	0	0	met	met
NET01 - Netley	97.9	97.8	87.5	96.6	94.9	0	0	met	met
KEN01 - Kensington Gardens	97.9	97.9	97.6	89.9	95.8	0	0	met	met
CHD01 - Christie Downs	94.7	89.8	94.9	93.3	93.2	0	0	met	met

Sulfur dioxide

Table 7 2010 compliance summary for SO₂ 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 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	94.7	97.5	97.9	97.4	96.9	0	0	0.0001	met	met	met
Spencer											
PTP01 - Pt Pirie Oliver Street	93.3	97.7	95.7	95.5	95.5	35	0	0.007	not met	met	met

Particulate matter as PM₁₀

Table 8 2010 compliance summary for PM₁₀ in South Australia

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

Region performance monitoring station/s	Data availability rates (% of days)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Adelaide							
ELI01 - Elizabeth Downs	98.9	89.0	100.0	98.9	96.7	1	met
NET01 - Netley	88.9	100.0	100.0	92.4	95.3	3	met
CHD01 - Christie Downs	96.7	100.0	95.7	93.5	96.4	5	met
Spencer							
WHY07 - Whyalla Schulz Park	98.9	100.0	100.0	95.7	98.6	3	met
PTP01 - Pt Pirie Oliver Street	91.1	100.0	100.0	92.4	95.9	3	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 PM₁₀ Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Lead

Table 9 2010 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)					Annual mean (µg/m ³)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Spencer							
PTP05 - Pt Pirie Frank Green Park	100.0	93.3	93.8	100.0	96.7	0.19	met
PTP01 - Pt Pirie Oliver Street	100.0	93.3	100.0	100.0	98.4	0.23	met

Lead data is reported to ambient conditions and analyses were carried out by NATA accredited facilities at the Queensland Health Forensic and Scientific Services laboratory (NATA accreditation no. 41).

Particulate matter as PM_{2.5}

Table 10 2010 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)					Number of days 24 hour standard exceeded	Annual Mean (µg/m ³)	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual			24 Hour	Annual
Adelaide									
NET01 Netley	95.6	100.0	100.0	97.8	98.4	0	7.5	met	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 PM₁₀ 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 2010 Goal

As assessed against the National Environment Protection (Ambient Air Quality) Measure (NEPM, 2003), the following observations were made for 2010:

- For CO the standard and goal were met at the Elizabeth station.
- For NO₂ the hourly and yearly standards and goals were met at all stations.
- For O₃ the 1 and 4-hour standards and goals were met at all stations.
- For SO₂ the 1-hour standard and goal were met at Northfield but not met at Port Pirie, Oliver Street. The 24 hour and annual standards and goals were met at both sites.
- For PM₁₀ the standard and goal were met at all stations.
- For Pb the annual standard and goal were met at Frank Green Park and Oliver Street monitoring sites.
- For PM_{2.5} at Netley both the 24-hour and annual advisory reporting standards were met.

Circumstances which led to Exceedences

Exceedences of the PM₁₀ standard occurred on a few occasions throughout the state. Tables 11 and 12 below summarises dates and inferred causes of exceedences occurring during the 2010 reporting year.

Exceedences of the SO₂ standard and goal occurred at Port Pirie. These exceedences 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 exceedences occurring during the 2010 reporting year.

Table 11 Summary of PM₁₀ exceedences in the Spencer region with corresponding data from the other site during 2010

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

Date of Exceedance (dd/mm/yyyy)	Spencer Region			
	WHY07 - Whyalla Schulz Park	Inferred Cause	PTP01 - Pt Pirie Oliver Street	Inferred Cause
02/02/2010	92.3	Wind blown dust & industry	124.8	Wind blown dust & industry
09/02/2010	45.6		142.9	Industry
28/02/2010	59.9	Wind blown dust	40.6	
01/03/2010	56.1	Wind blown dust	41.1	
10/07/2010	21.3		54.3	Wind blown 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 PM₁₀ Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Table 12 Summary of PM₁₀ exceedences in the Adelaide region during 2010 with corresponding data from other sites

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

Date of Exceedance (dd/mm/yyyy)	Adelaide Region			
	CHD01	ELI01	NET01	Inferred Cause
22/01/2010	53.2	46.5	38.4	Wind blown dust
02/02/2010	88.7	209.5	93.9	Windblown dust
03/02/2010	72.7	No data	55.1	Wind blown dust
20/02/2010	55.7	49.3	57.1	Wind blown dust
28/02/2010	52.4	41.6	33.7	Wind blown 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 PM₁₀ Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Table 13 Summary of SO₂ exceedences during 2010 in South Australia

			AAQ NEPM Standard 0.20 ppm (1-hr average)		
Date of Exceedance (dd/mm/yyyy)	Spencer Region		Date of Exceedance (dd/mm/yyyy)	Spencer Region	
	PTP01 - Pt Pirie Oliver Street	Inferred Cause		PTP01 - Pt Pirie Oliver Street	Inferred Cause
04/01/2010 10:00	0.202	Industrial source with suitable meteorological conditions	13/05/2010 14:00	0.263	Industrial source with suitable meteorological conditions
04/01/2010 11:00	0.540	As above	14/05/2010 15:00	0.332	As above
15/01/2010 11:00	0.201	As above	03/06/2010 14:00	0.273	As above
19/01/2010 09:00	0.252	As above	15/06/2010 15:00	0.384	As above
19/01/2010 10:00	0.396	As above	16/06/2010 00:00	0.229	As above
19/01/2010 11:00	0.266	As above	17/06/2010 02:00	0.761	As above
25/01/2010 12:00	0.212	As above	20/06/2010 13:00	0.219	As above
09/02/2010 10:00	0.495	As above	22/06/2010 14:00	0.210	As above
19/02/2010 10:00	0.296	As above	26/06/2010 10:00	0.202	As above
19/02/2010 11:00	0.261	As above	04/07/2010 16:00	0.213	As above
26/02/2010 11:00	0.333	As above	28/08/2010 13:00	0.270	As above
06/03/2010 12:00	0.223	As above	29/08/2010 14:00	0.298	As above
01/04/2010 13:00	0.232	As above	29/08/2010 16:00	0.247	As above
02/04/2010 13:00	0.342	As above	24/09/2010 17:00	0.293	As above
07/04/2010 11:00	0.266	As above	05/10/2010 11:00	0.424	As above
14/04/2010 11:00	0.302	As above	05/10/2010 12:00	0.275	As above
15/04/2010 12:00	0.236	As above	08/11/2010 11:00	0.246	As above
20/04/2010 12:00	0.263	As above	08/11/2010 12:00	0.232	As above
21/04/2010 12:00	0.242	As above	26/11/2010 09:00	0.303	As above
21/04/2010 13:00	0.408	As above	26/11/2010 15:00	0.225	As above
30/04/2010 11:00	0.204	As above	02/12/2010 10:00	0.349	As above
07/05/2010 12:00	0.268	As above	28/12/2010 11:00	0.282	As above

Note: times shown are finish times for events.

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. Note that the times shown are finish times for events. The AAQ NEPM states that the short-term standards should not be exceeded on more than one day for CO, NO₂, O₃, SO₂ and on no more than five days per year for PM₁₀ (NEPC, 2003). The second highest daily value for the year (or the sixth for PM₁₀) indicates the extent to which the standards are or are not met.

Carbon monoxide

The standard and goal for carbon monoxide were easily met at Elizabeth as CO levels were well below the AAQ NEPM standard. The highest concentration recorded reached only 4% of the standard.

Table 14 2010 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	359	0.4	16 Jul 01:00 06 Aug 01:00 06 Aug 02:00	0.3	11 Jun 01:00

Nitrogen dioxide

Nitrogen dioxide concentrations were below the AAQ NEPM standard. The highest concentrations recorded varied from 28% of the standard at Kensington to 45% of the standard at Netley. Second highest concentrations varied from 25% of the standard at Elizabeth and Kensington to 39% of the standard at Netley. Hence the 1-hour standard and goal were met at all stations.

Table 15 2010 summary statistics for daily peak 1-hour NO₂ 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	359	0.035	24 Mar 20:00	0.030	26 Mar 17:00 21 Jun 17:00
CHD01 - Christie Downs	347	0.035	11 Nov 20:00	0.032	25 Mar 20:00
KEN01 - Kensington	365	0.034	21 Jul 12:00	0.030	26 Feb 08:00 19 May 18:00 30 Aug 19:00
NET01 - Netley	347	0.054	11 Nov 19:00	0.047	21 Aug 22:00
NOR01 - Northfield	364	0.045	24 Mar 20:00 26 Mar 18:00	0.038	26 Feb 11:00

Ozone

The highest concentration of ozone, based on 1-hour averages, was measured at Christie Downs. The concentration reached 76% of the AAQ NEPM standard. The highest concentrations measured at the other stations varied from 61%-66% of the standard. The second highest concentrations ranged from 56% to 66% of the standard. Both the standard and goal were met at all stations.

Table 16 2010 summary statistics for daily peak 1-hour O₃ 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	0.066	09 Feb 16:00	0.063	07 Jan 15:00
CHD01 - Christie Downs	351	0.076	09 Jan 12:00	0.066	03 Feb 15:00
KEN01 - Kensington	358	0.062	10 Feb 12:00	0.061	09 Jan 11:00
NET01 - Netley	356	0.062	10 Jan 10:00	0.059	10 Feb 17:00
NOR01 - Northfield	364	0.061	09 Jan 12:00	0.056	07 Jan 13:00

Table 17 2010 summary statistics for daily peak 4-hour O₃ in South Australia

AAQ NEPM Standard 0.08 ppm (4-hr average)					
Region &	Number of	Highest	Highest	2nd highest	2nd highest

Station/s	valid days	(ppm)	(dd mon hh:mm)	(ppm)	(dd mon hh:mm)
Adelaide					
ELI01 - Elizabeth	365	0.059	09 Feb 18:00	0.058	07 Jan 17:00
CHD01 - Christie Downs	351	0.060	09 Jan 14:00 10 Feb 15:00	0.057	03 Feb 17:00
KEN01 - Kensington	358	0.057	08 Feb 15:00	0.055	10 Feb 13:00
NET01 - Netley	357	0.056	10 Feb 17:00 10 Feb 18:00	0.054	03 Feb 17:00
NOR01 - Northfield	364	0.050	08 Feb 14:00 08 Feb 15:00 09 Feb 17:00 09 Feb 18:00	0.049	09 Jan 14:00 10 Feb 01:00

Sulfur dioxide

In the Adelaide region the concentration of sulfur dioxide, based on 1-hour averages, reached a maximum of 7% of the AAQ NEPM standard. The second highest concentration was 5% of the standard. The standard and goal were easily met in the Adelaide region.

At Pirie however the maximum concentration exceeded the standard. In Port Pirie the maximum was 381% of the standard and the second highest concentration was 270% of the standard, both of which are significant exceedences. Hence the 1-hour standard and goal were not met in the Spencer region.

Table 18 2010 summary statistics for daily peak 1-hour SO₂ 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	0.013	19 May 15:00 19 May 18:00 19 May 19:00	0.010	28 Jun 03:00
Spencer					
PTP01 - Pt Pirie Oliver St	362	0.761	17 Jun 02:00	0.540	04 Jan 11:00

There were no exceedences of the 24-hour standard for sulfur dioxide hence the goal was met in both the Adelaide and Spencer regions. In the Adelaide region the maximum concentration was only 4% of the standard and in the Spencer region the maximum reached 58% of the standard. Second highest concentrations were 3% and 55% of the standard in Adelaide and Spencer respectively.

Table 19 2010 summary statistics for daily peak 24-hour SO₂ 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	360	0.003	19 May	0.002	23 Apr 03 Jun 09 Jun 23 Jun 30 Jun 10 Oct
Spencer					
PTP01 - Pt Pirie Oliver St	360	0.046	19 Jan	0.044	04 Jan

Particulate matter as PM₁₀

Exceedences of the 24-hour AAQ NEPM standard were recorded at all five monitoring stations in the Adelaide and Spencer monitoring regions. The maximum concentration recorded in the Adelaide region was at Elizabeth and was 419% of the standard. Maximum concentrations were not as high at the other stations but were still 177% and 188% of the standard at Christie Downs and Netley respectively.

The highest in the Spencer region was at Oliver Street in Port Pirie and was 286% of the standard. At Whyalla the highest concentration was 185% of the standard.

The goal was met at all stations as the 6th highest concentration at each monitoring station was below the NEPM standard. 6th highest maximums ranged from 79% to 86% of the standard in the Adelaide region. At Port Pirie and Whyalla in the Spencer region maximums were 82% and 75% of the standard respectively.

Table 20 2010 summary statistics for 24-hour PM₁₀ 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	353	209.5	02 Feb	39.6	31 Dec
CHD01 - Christie Downs	352	88.7	02 Feb	43.2	01 Mar
NET01 - Netley	348	93.9	02 Feb	40.1	18 Mar
Spencer					
PTP01 - Pt Pirie Oliver St	350	142.9	09 Feb	41.1	01 Mar
WHY07 - Whyalla Schulz Park	360	92.3	02 Feb	37.6	22 Jan

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 PM₁₀ Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

Particulate matter as PM_{2.5}

No exceedence of the PM_{2.5} advisory reporting standard was recorded in 2010. The highest and 6th highest concentrations were 81% and 52% of the standard respectively. Hence the PM_{2.5} standard was met for 2010.

Table 21 2010 summary statistics for 24-hour PM_{2.5} in South Australia

AAQ NEPM Advisory Reporting Standard
25 µg/m³ (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	343	20.3	02 Feb	13.0	10 Feb
Netley					4 Jun

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 PM₁₀ Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

SECTION D - TRENDS AND POLLUTANT DISTRIBUTIONS

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 have been calculated from daily maxima as required in PRC technical paper number 8 (2010).

Figures 3-33 below are graphs of the trend data supplied in tables 22-50. The AAQ NEPM standards are shown except where the standards are too large to fit on the scale of the graph. Using the 95th percentile as an indicator the following observations regarding trends can be made:

- Carbon monoxide concentrations have been showing a decreasing trend.
- Nitrogen dioxide concentrations at Kensington, Netley, Northfield and Elizabeth have been showing a slight decrease while concentrations at Christie Downs have been increasing slightly.
- 1-hour ozone concentrations appear to be steady at Christie Downs, Kensington, Northfield and Elizabeth; although there is noticeable yearly variation. At Netley there is possibly a small increase in concentration.
- 4-hour ozone concentrations appear to increase slightly at Elizabeth, Netley and Kensington. They remain steady at Northfield and decreased slightly at Christie Downs.
- 1-hour sulfur dioxide concentrations are increasing at Oliver Street Port Pirie but decreasing at Northfield.
- 24-hour sulfur dioxide concentrations have remained steady for the last four years at Northfield although daily peak 24-hour SO₂ concentrations here are extremely low. Concentrations at Port Pirie have also remained steady since 2005.
- PM₁₀ concentrations at Elizabeth, Netley, Christie Downs and Whyalla showed an increase initially, up until 2009, but have dropped again in 2010. Concentrations in Port Pirie also increased initially but have dropped in the last 2 years. Concentrations at Kensington have been showing a small increasing trend.
- Lead concentrations at both NEPM sites in Port Pirie are showing a decreasing trend.
- PM_{2.5} at Netley appears to be decreasing slightly, although there is yearly variation.

Carbon monoxide

Table 22 Percentiles of daily peak 8-hour CO concentrations for Adelaide, ELI01 - Elizabeth Downs (2002 - 2010)

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	83.6	0.8	0.7	0.6	0.4	0.3	0.2	0.1
2003	91.7	1.4	0.8	0.7	0.5	0.4	0.2	0.1
2004	97.7	0.8	0.6	0.5	0.4	0.3	0.2	0.1
2005	93.6	0.8	0.6	0.4	0.4	0.3	0.1	0.1
2006	85.9	0.7	0.5	0.4	0.3	0.2	0.1	0.0
2007	99.7	0.6	0.4	0.3	0.3	0.2	0.1	0.0
2008	95.7	0.5	0.4	0.3	0.3	0.2	0.1	0.0
2009	99.8	0.4	0.3	0.3	0.2	0.2	0.1	0.1
2010	97.8	0.4	0.3	0.3	0.3	0.2	0.1	0.1

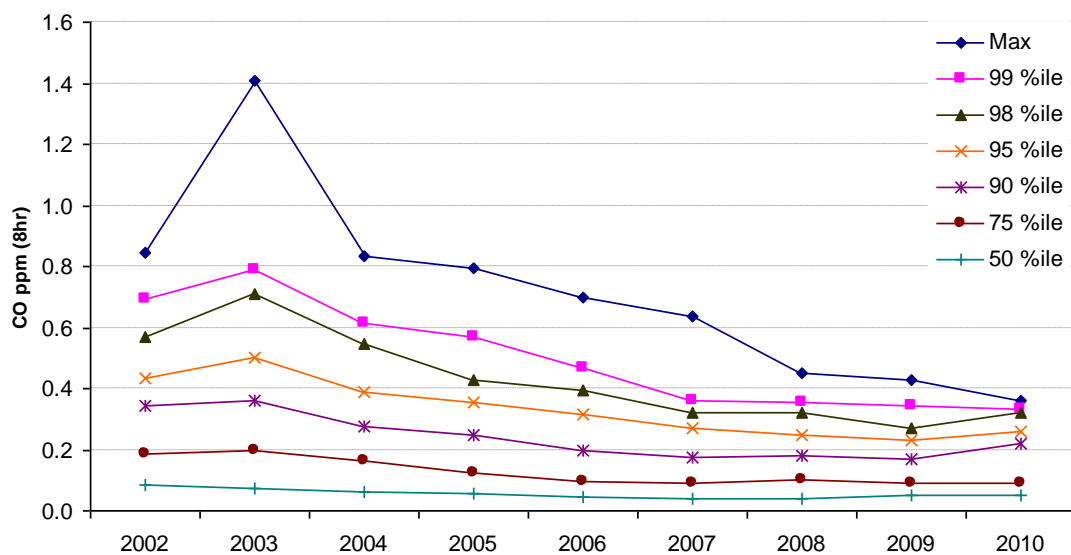


Figure 3 Percentiles of daily peak 8-hour CO concentrations for Adelaide, ELI01-Elizabeth Downs (2002-2010)

Nitrogen dioxide

Table 23 Percentiles of daily peak 1-hour NO₂ concentrations for ELI01-Elizabeth Downs (2002-2010)

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	93.8	0.040	0.034	0.033	0.029	0.026	0.022	0.014
2003	96.7	0.043	0.030	0.028	0.025	0.022	0.019	0.011
2004	94.7	0.037	0.031	0.029	0.025	0.023	0.019	0.012
2005	94.7	0.038	0.031	0.028	0.025	0.023	0.019	0.011
2006	89.2	0.043	0.030	0.029	0.026	0.023	0.017	0.011
2007	94.5	0.039	0.026	0.025	0.023	0.021	0.017	0.011
2008	93.4	0.031	0.027	0.027	0.024	0.023	0.018	0.011
2009	97.2	0.028	0.027	0.026	0.024	0.022	0.017	0.010
2010	94.8	0.035	0.028	0.027	0.025	0.023	0.017	0.011

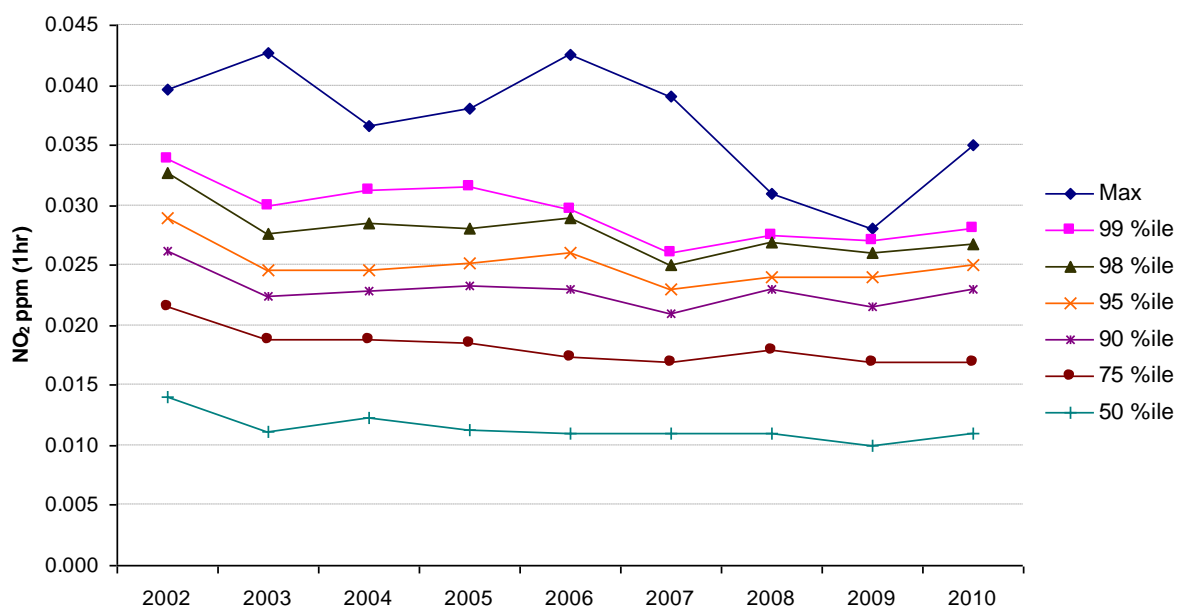


Figure 4 Percentiles of daily peak 1-hour NO₂ concentrations for ELI01 - Elizabeth Downs (2002-2010)

Table 24 Percentiles of daily peak 1-hour NO₂ concentrations for NOR01-Northfield (2002 - 2010)

AAQ NEPM Standard
0.12 ppm (1-hr average)

Year	Data	Max	Percentiles (ppm)
------	------	-----	-------------------

yyyy	availability rates (%)	(ppm)	99th	98th	95th	90th	75th	50th
2002	94.1	0.047	0.038	0.033	0.031	0.028	0.024	0.018
2003	95.1	0.039	0.035	0.032	0.031	0.028	0.024	0.017
2004	96.1	0.045	0.038	0.033	0.029	0.026	0.023	0.017
2005	94.2	0.039	0.035	0.033	0.030	0.028	0.024	0.018
2006	93.4	0.034	0.031	0.030	0.028	0.025	0.021	0.016
2007	95.6	0.037	0.034	0.032	0.029	0.027	0.023	0.017
2008	96.9	0.041	0.035	0.034	0.030	0.028	0.025	0.017
2009	96.6	0.042	0.034	0.031	0.028	0.027	0.023	0.017
2010	96.7	0.045	0.035	0.033	0.030	0.027	0.023	0.016

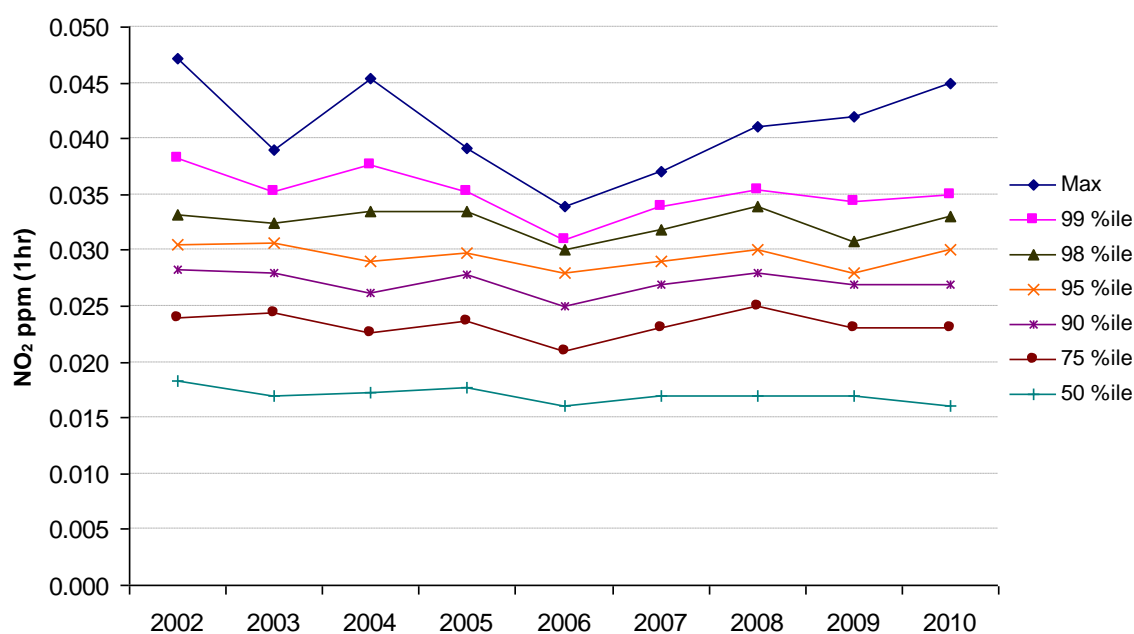


Figure 5 Percentiles of daily peak 1-hour NO₂ concentrations for NOR01-Northfield (2002-2010)

Table 25 Percentiles of daily peak 1-hour NO₂ concentrations for NET01-Netley (2002 - 2010)

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	84.4	0.050	0.042	0.037	0.035	0.032	0.028	0.023

2003	97.2	0.039	0.036	0.035	0.032	0.029	0.026	0.021
2004	96.2	0.103	0.041	0.038	0.034	0.030	0.026	0.021
2005	97.1	0.051	0.042	0.037	0.034	0.031	0.028	0.022
2006	94.6	0.054	0.037	0.036	0.033	0.030	0.027	0.021
2007	97.4	0.040	0.038	0.036	0.032	0.030	0.028	0.023
2008	97.2	0.047	0.040	0.039	0.035	0.031	0.027	0.022
2009	97.3	0.050	0.038	0.035	0.032	0.030	0.026	0.021
2010	91.2	0.054	0.039	0.036	0.032	0.029	0.026	0.020



Figure 6 Percentiles of daily peak 1-hour NO₂ concentrations for NET01- Netley (2002-2010)

Table 26 Percentiles of daily peak 1-hour NO₂ concentrations for KEN01-Kensington Gardens (2002 - 2010)

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	0.041	0.030	0.030	0.028	0.025	0.022	0.015
2003	96.9	0.040	0.034	0.031	0.026	0.024	0.021	0.014
2004	96.2	0.037	0.032	0.028	0.025	0.023	0.019	0.013

2005	97.5	0.031	0.029	0.027	0.026	0.024	0.019	0.013
2006	96.4	0.037	0.028	0.027	0.025	0.022	0.018	0.013
2007	93.6	0.035	0.030	0.029	0.026	0.023	0.020	0.014
2008	94.6	0.032	0.028	0.027	0.025	0.023	0.019	0.012
2009	97.5	0.039	0.028	0.027	0.025	0.023	0.018	0.012
2010	97.5	0.034	0.029	0.027	0.025	0.022	0.018	0.011

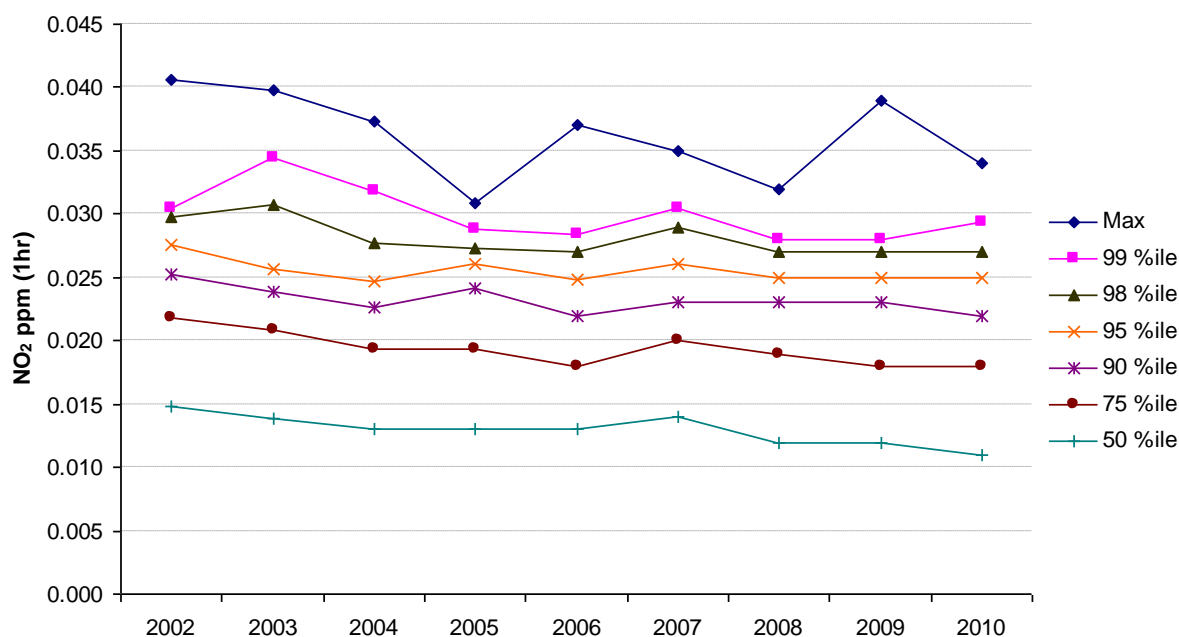


Figure 7 Percentiles of daily peak 1-hour NO₂ concentrations for KEN01- Kensington Gardens (2002-2010)

Table 27 Percentiles of daily peak 1-hour NO₂ concentrations for CHD01-Christie Downs (2006 - 2010)

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	0.033	0.029	0.029	0.026	0.025	0.021	0.015
2007	96.7	0.038	0.031	0.030	0.027	0.025	0.020	0.013
2008	94.7	0.036	0.033	0.031	0.028	0.026	0.021	0.013
2009	90.5	0.043	0.035	0.032	0.027	0.026	0.022	0.013
2010	91.3	0.035	0.030	0.029	0.027	0.025	0.021	0.014

Years shown in italics indicate data availability is less than 75%

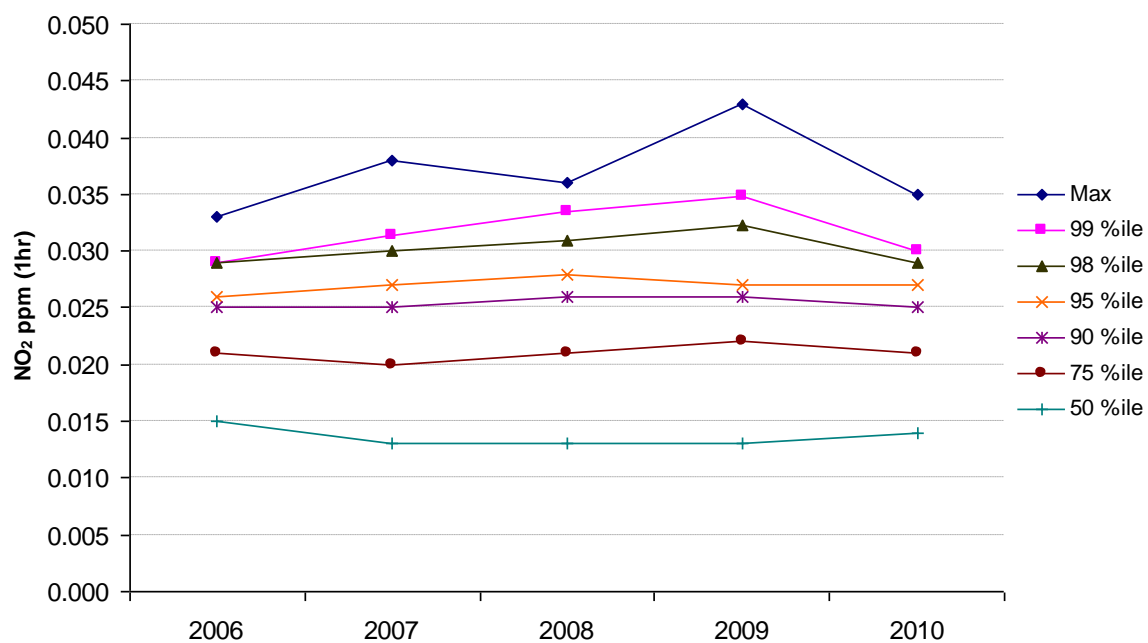


Figure 8 Percentiles of daily peak 1-hour NO₂ concentrations for CHD01- Christie Downs (2006-2010)

Ozone

Table 28 Percentiles of daily peak 1-hour O₃ concentrations for ELI01-Elizabeth Downs (2002 - 2010)

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	95.1	0.072	0.062	0.053	0.045	0.040	0.033	0.030
2003	96.7	0.077	0.064	0.059	0.050	0.042	0.034	0.029
2004	96.1	0.088	0.065	0.055	0.046	0.041	0.033	0.029
2005	97.2	0.062	0.057	0.050	0.041	0.036	0.032	0.029
2006	89.9	0.072	0.061	0.055	0.051	0.040	0.035	0.029
2007	97.5	0.082	0.070	0.065	0.051	0.045	0.035	0.030
2008	97.4	0.097	0.059	0.055	0.042	0.039	0.033	0.030
2009	97.5	0.073	0.061	0.059	0.051	0.044	0.034	0.030
2010	97.7	0.066	0.056	0.051	0.045	0.039	0.032	0.027

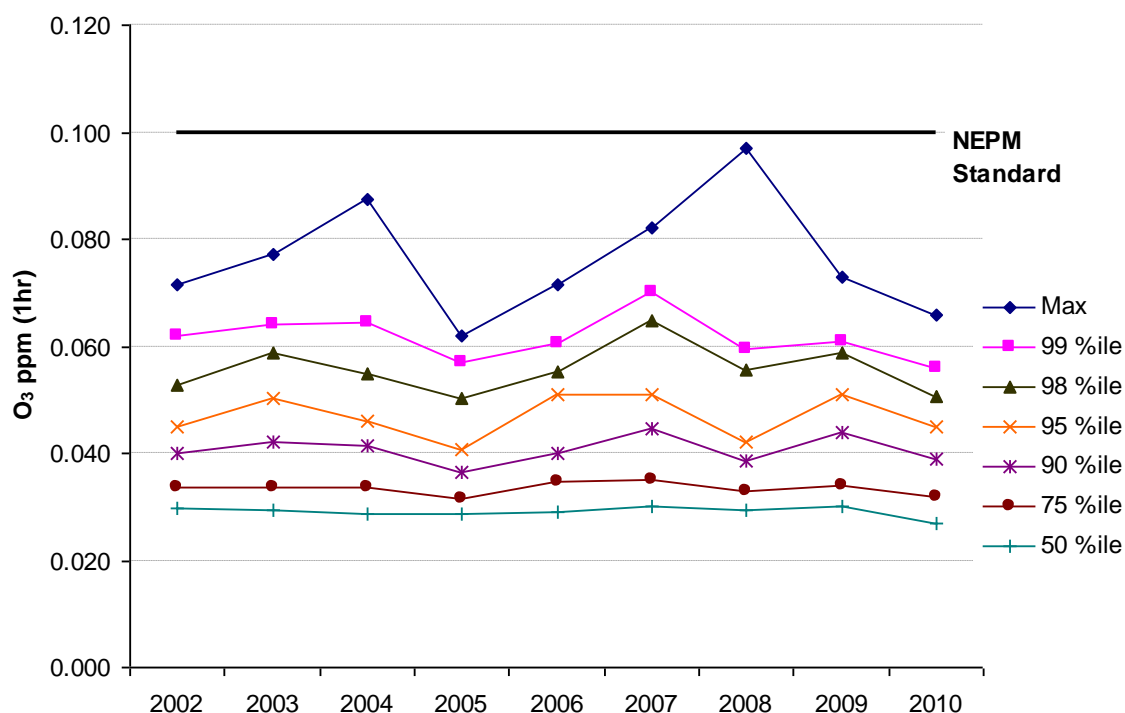


Figure 9 Percentiles of daily peak 1-hour O₃ concentrations for ELI01 - Elizabeth Downs (2002-2010)

Table 29 Percentiles of daily peak 1-hour O₃ concentrations for NOR01-Northfield (2002 - 2010)

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	97.5	0.080	0.060	0.051	0.045	0.040	0.033	0.029
2003	97.5	0.068	0.060	0.054	0.047	0.042	0.033	0.028
2004	94.1	0.081	0.065	0.058	0.045	0.040	0.033	0.028
2005	94.4	0.060	0.049	0.045	0.040	0.036	0.031	0.028
2006	94.5	0.067	0.053	0.050	0.043	0.038	0.031	0.027
2007	97.4	0.069	0.060	0.054	0.047	0.042	0.033	0.029
2008	97.2	0.074	0.054	0.048	0.042	0.038	0.032	0.028
2009	97.0	0.081	0.059	0.056	0.047	0.042	0.032	0.027
2010	96.9	0.061	0.052	0.051	0.046	0.039	0.033	0.029

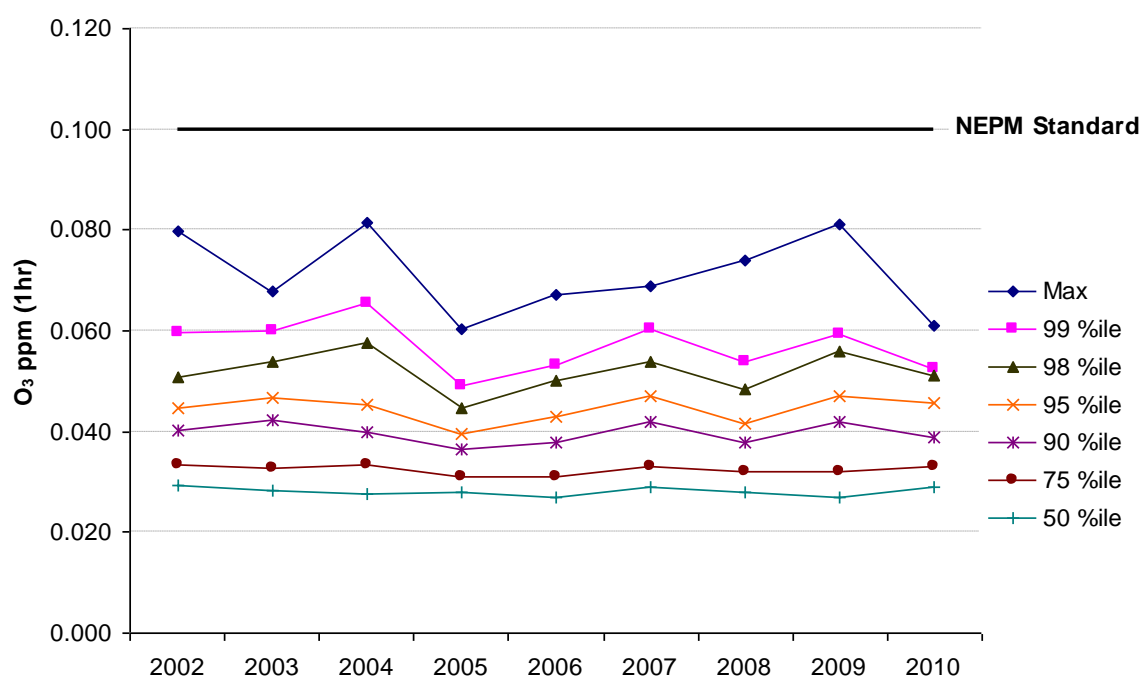


Figure 10 Percentiles of daily peak 1-hour O₃ concentrations for NOR01-Northfield (2002-2010)

Table 30 Percentiles of daily peak 1-hour O₃ concentrations for NET01-Netley (2002 - 2010)

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	98.2	0.087	0.056	0.048	0.042	0.037	0.031	0.028
2003	97.4	0.069	0.059	0.054	0.045	0.039	0.032	0.027
2004	97.5	0.067	0.056	0.049	0.044	0.037	0.032	0.028
2005	96.8	0.079	0.054	0.049	0.041	0.037	0.032	0.028
2006	94.6	0.105	0.058	0.054	0.043	0.038	0.031	0.028
2007	97.4	0.077	0.055	0.052	0.046	0.040	0.033	0.029
2008	97.0	0.071	0.056	0.047	0.041	0.037	0.032	0.029
2009	97.4	0.070	0.062	0.056	0.048	0.041	0.032	0.028
2010	94.9	0.062	0.056	0.052	0.045	0.038	0.031	0.027

Data shown in bold type indicates an exceedence of the NEPM standard.

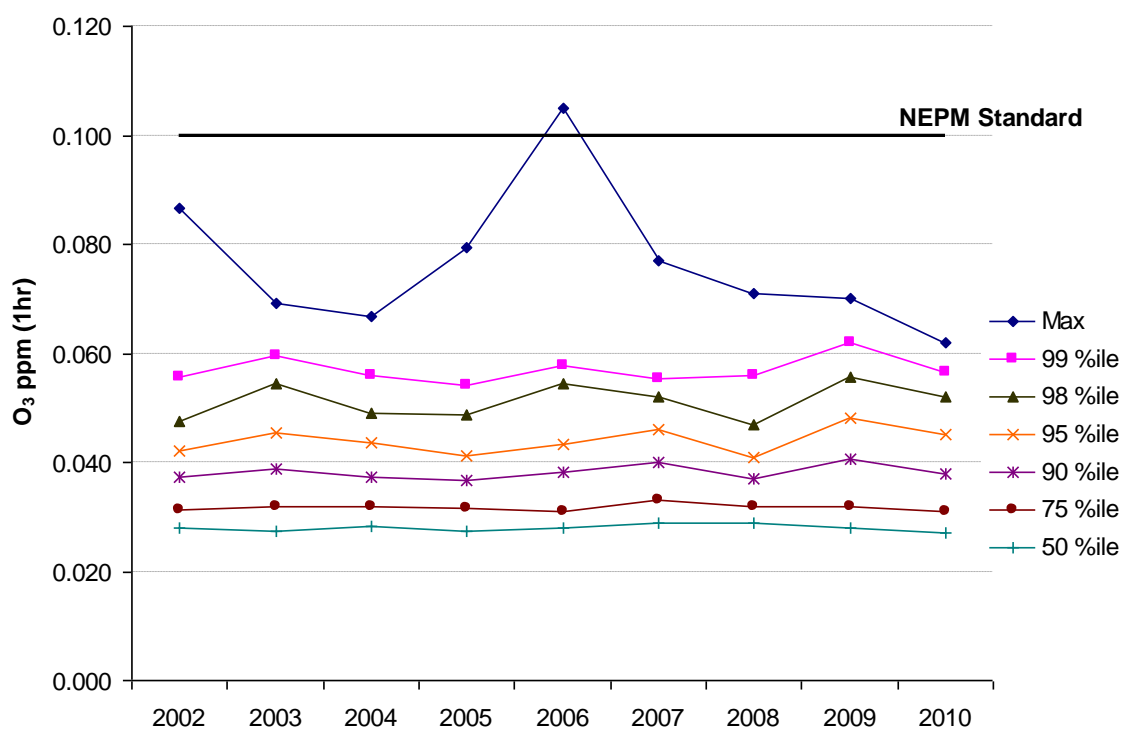


Figure 11 Percentiles of daily peak 1-hour O₃ concentrations at NET01-Netley (2002-2010)

Table 31 Percentiles of daily peak 1-hour O₃ concentrations for KEN01-Kensington Gardens (2002 - 2010)

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	95.9	0.086	0.057	0.053	0.046	0.042	0.035	0.030
2003	96.9	0.074	0.065	0.058	0.049	0.042	0.034	0.029
2004	97.2	0.078	0.067	0.062	0.047	0.041	0.033	0.029
2005	97.6	0.061	0.053	0.051	0.044	0.039	0.034	0.031
2006	96.3	0.090	0.061	0.057	0.048	0.040	0.033	0.029
2007	95.5	0.076	0.062	0.058	0.051	0.045	0.034	0.030
2008	95.0	0.072	0.059	0.053	0.044	0.039	0.033	0.029
2009	97.5	0.082	0.060	0.058	0.047	0.040	0.032	0.027
2010	95.8	0.062	0.055	0.053	0.047	0.041	0.034	0.030

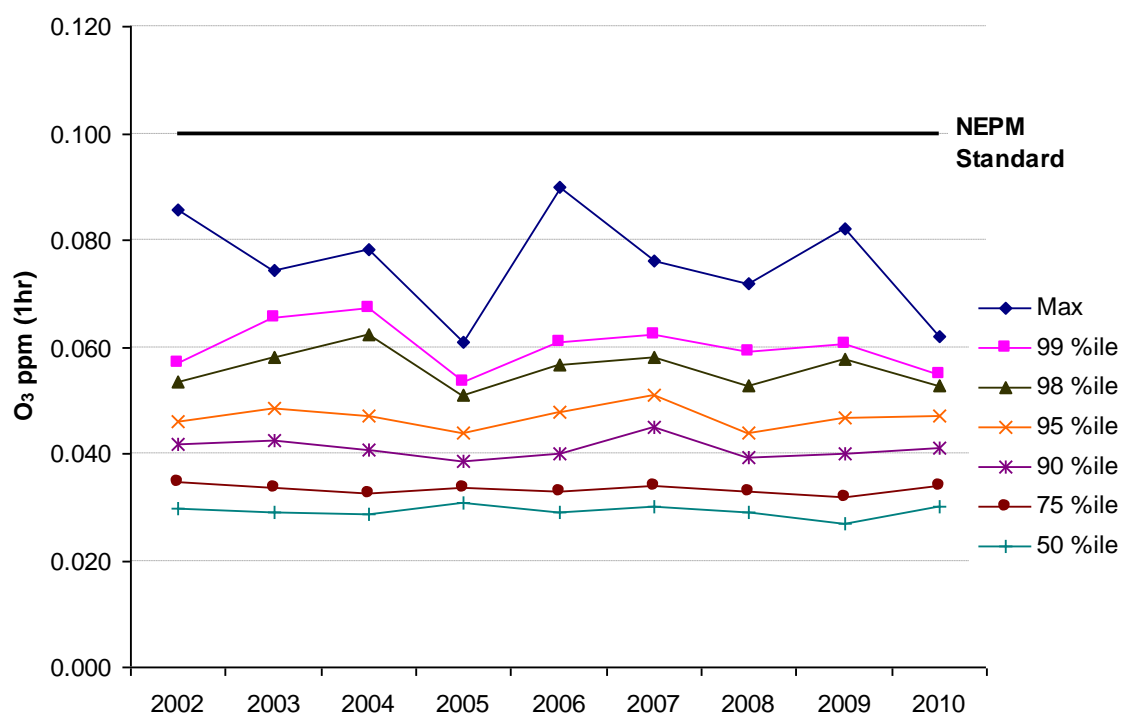


Figure 12 Percentiles of daily peak 1-hour O₃ concentrations for KEN01- Kensington Gardens (2002-2010)

Table 32 Percentiles of daily peak 1-hour O₃ concentrations for CHD01-Christie Downs (2006 - 2010)

AAQ NEPM Standard
0.10 ppm (1-hr average)

Year yyyy	Data availability rates (%)	Max (ppm)	Percentiles (ppm)					
			99th	98th	95th	90th	75th	50 th
2006	65.6	0.055	0.050	0.046	0.040	0.037	0.033	0.030
2007	96.7	0.074	0.054	0.053	0.046	0.040	0.034	0.030
2008	95.8	0.068	0.052	0.046	0.041	0.038	0.032	0.029
2009	92.9	0.066	0.055	0.050	0.043	0.037	0.031	0.027
2010	93.2	0.076	0.055	0.048	0.040	0.037	0.031	0.027

Years shown in italics indicate data availability is less than 75%.

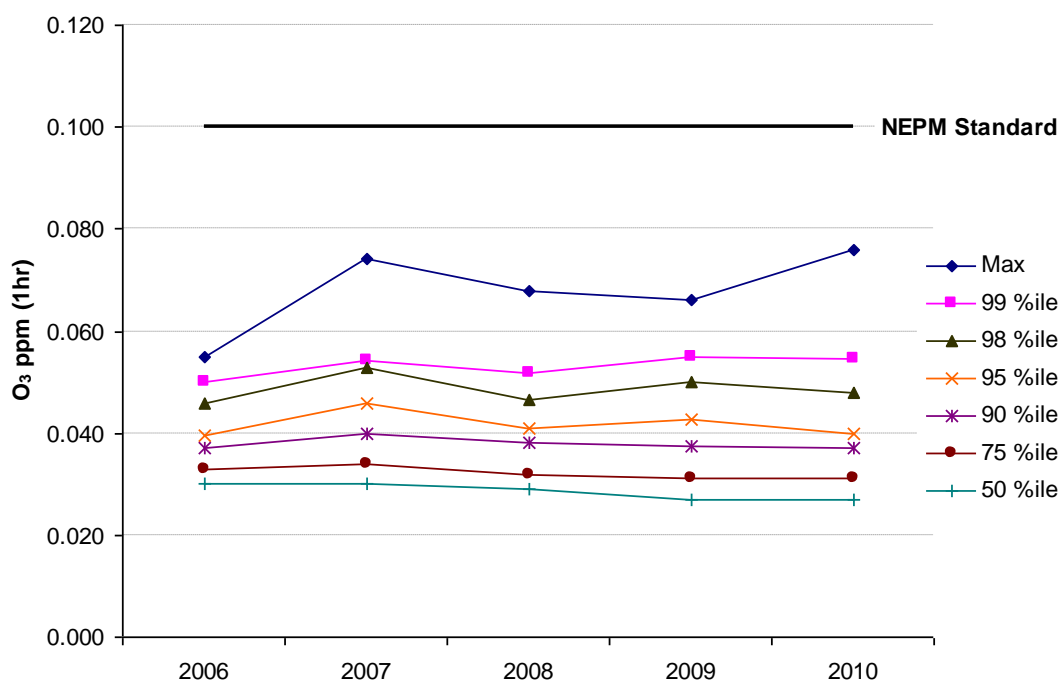


Figure 13 Percentiles of daily peak 1-hour O₃ concentrations for CHD01- Christie Downs (2006-2010)

Table 33 Percentiles of daily peak 4-hour rolling O₃ concentrations for ELI01-Elizabeth Downs (2002 - 2010)

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	96.3	0.057	0.046	0.044	0.039	0.037	0.032	0.029
2003	98.7	0.063	0.056	0.052	0.045	0.040	0.032	0.028

2004	98.2	0.079	0.056	0.051	0.042	0.037	0.032	0.027
2005	99.2	0.056	0.049	0.044	0.038	0.034	0.030	0.028
2006	91.7	0.065	0.051	0.049	0.045	0.038	0.033	0.028
2007	99.5	0.078	0.063	0.056	0.048	0.042	0.033	0.029
2008	99.5	0.086	0.051	0.048	0.041	0.037	0.032	0.028
2009	99.6	0.070	0.054	0.051	0.047	0.042	0.033	0.029
2010	99.7	0.059	0.050	0.048	0.041	0.037	0.030	0.026

Data shown in bold type indicates an exceedence of the NEPM standard.

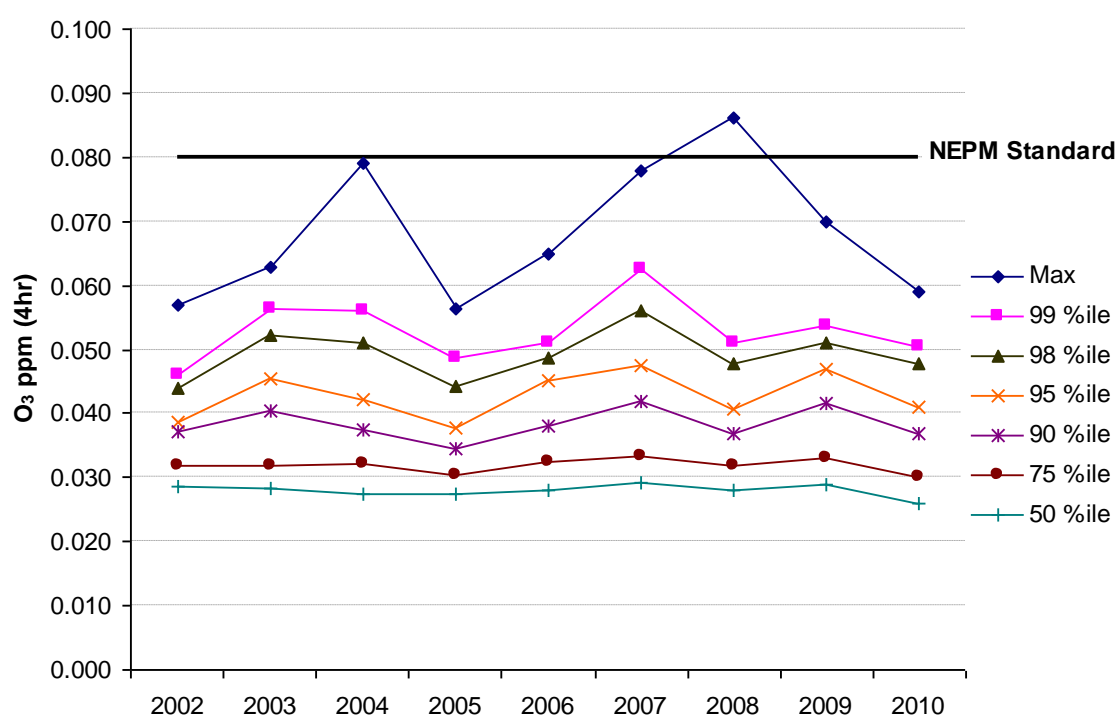


Figure 14 Percentiles of daily peak 4-hour O₃ concentrations at ELI01 - Elizabeth Downs (2002-2010)

Table 34 Percentiles of daily peak 4-hour rolling O₃ concentrations for NOR01-Northfield (2002 - 2010)

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	98.9	0.064	0.052	0.046	0.041	0.036	0.031	0.028
2003	99.5	0.061	0.053	0.047	0.044	0.038	0.031	0.027
2004	95.9	0.067	0.058	0.049	0.041	0.038	0.032	0.027
2005	96.3	0.054	0.046	0.041	0.036	0.035	0.030	0.027

2006	96.7	0.058	0.048	0.045	0.040	0.035	0.030	0.026
2007	99.9	0.059	0.054	0.052	0.044	0.040	0.032	0.028
2008	99.6	0.068	0.049	0.045	0.039	0.035	0.031	0.027
2009	98.9	0.064	0.054	0.051	0.043	0.039	0.030	0.026
2010	98.9	0.050	0.048	0.046	0.042	0.037	0.032	0.028

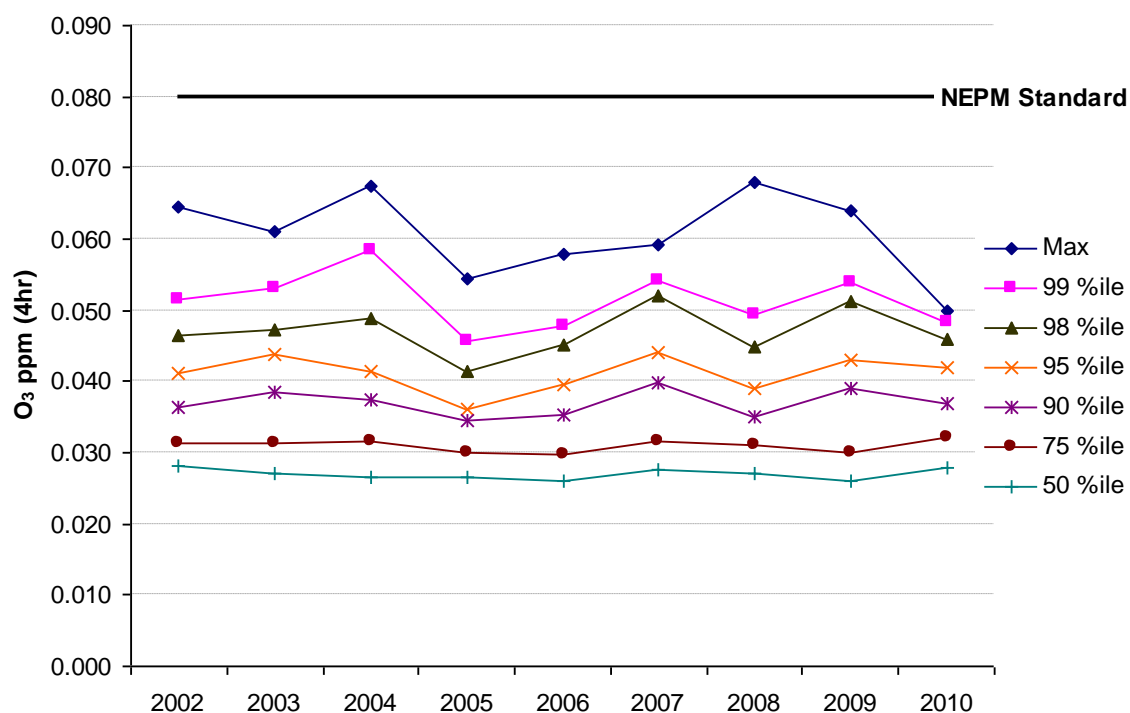


Figure 15 Percentiles of daily peak 4-hour O₃ concentrations for NOR01-Northfield (2002-2010)

Table 35 Percentiles of daily peak 4-hour rolling O₃ concentrations for NET01-Netley (2002 - 2010)

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	99.5	0.071	0.050	0.044	0.038	0.034	0.030	0.027
2003	99.4	0.060	0.053	0.047	0.042	0.037	0.030	0.027
2004	99.6	0.059	0.048	0.044	0.040	0.036	0.031	0.027
2005	98.8	0.072	0.048	0.044	0.038	0.034	0.030	0.027
2006	96.7	0.094	0.052	0.047	0.041	0.036	0.030	0.027
2007	99.8	0.070	0.051	0.050	0.044	0.038	0.032	0.028
2008	99.2	0.061	0.049	0.043	0.039	0.036	0.031	0.027

2009	99.3	0.062	0.053	0.048	0.042	0.038	0.031	0.027
2010	96.7	0.056	0.051	0.046	0.041	0.036	0.030	0.026

Data shown in bold type indicates an exceedence of the NEPM standard.

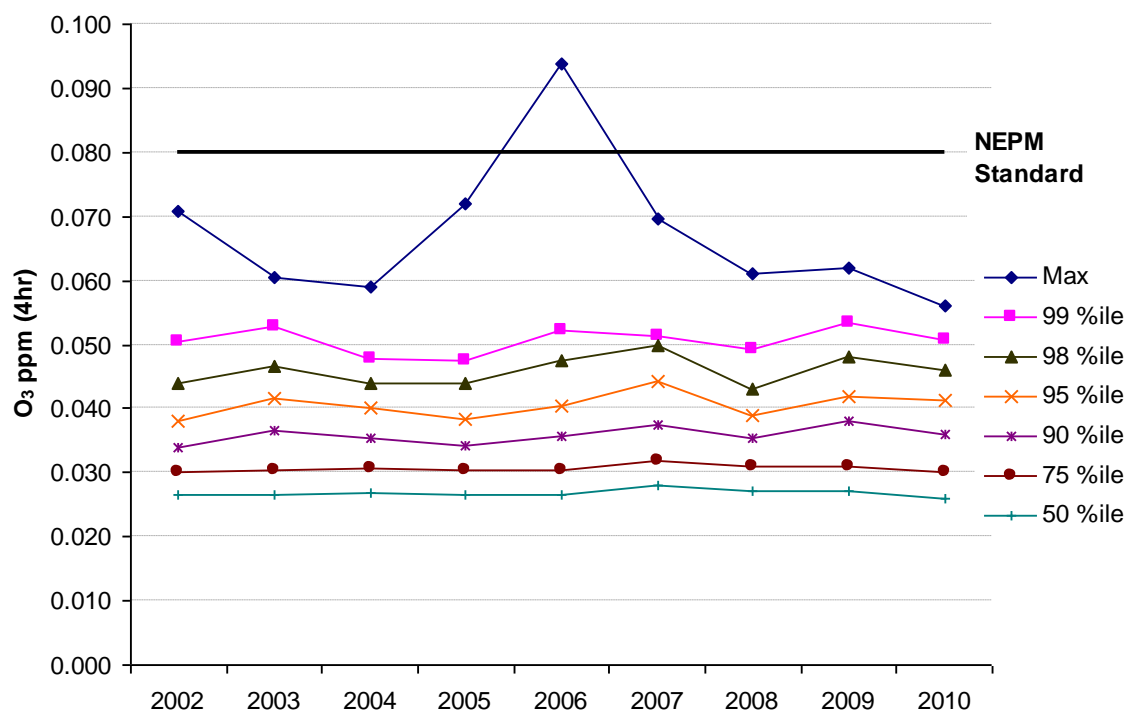


Figure 16 Percentiles of daily peak 4-hour O₃ concentrations for NET01-Netley (2002-2010)

Table 36 Percentiles of daily peak 4-hour rolling O₃ concentrations for KEN01-Kensington Gardens (2002 - 2010)

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	97.2	0.073	0.051	0.047	0.041	0.038	0.033	0.029
2003	98.9	0.071	0.054	0.051	0.045	0.040	0.032	0.028
2004	99.2	0.071	0.059	0.054	0.043	0.038	0.031	0.028
2005	99.6	0.055	0.050	0.044	0.040	0.037	0.032	0.029
2006	98.7	0.072	0.055	0.051	0.044	0.039	0.032	0.028
2007	97.8	0.063	0.058	0.054	0.047	0.043	0.033	0.029
2008	97.2	0.067	0.055	0.048	0.042	0.037	0.031	0.028
2009	99.1	0.066	0.054	0.051	0.043	0.038	0.030	0.026
2010	97.9	0.057	0.051	0.049	0.044	0.039	0.033	0.029

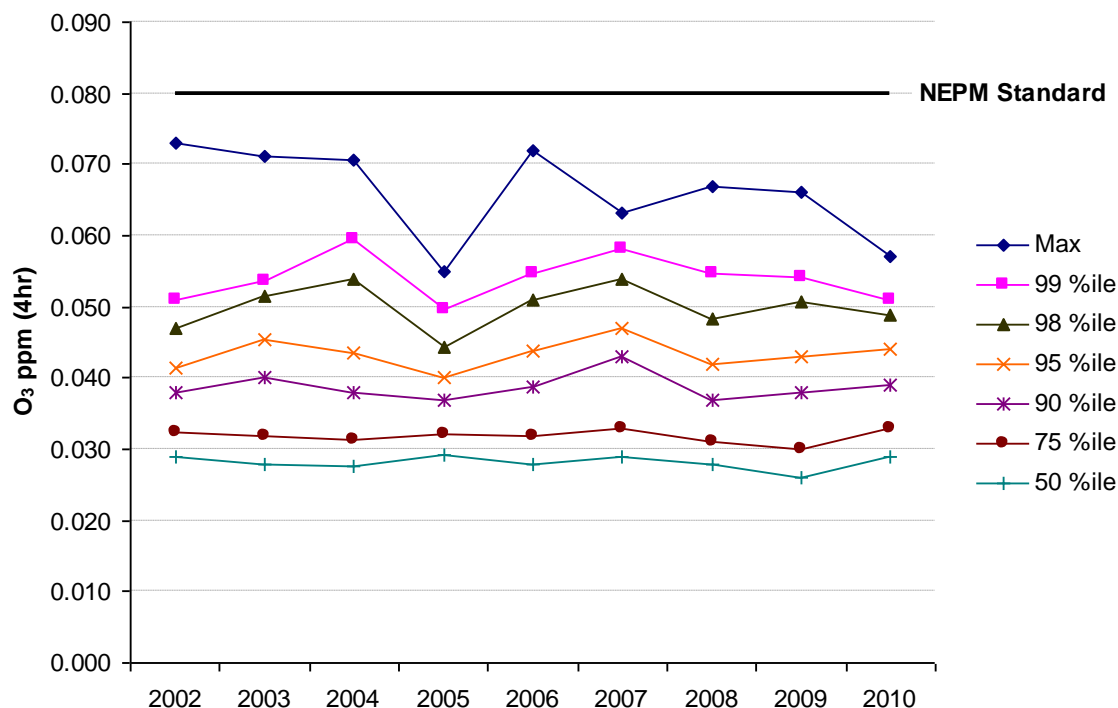


Figure 17 Percentiles of daily peak 4-hour O₃ concentrations for KEN01- Kensington Gardens (2002-2010)

Table 37 Percentiles of daily peak 4-hour rolling O₃ concentrations for CHD01-Christie Downs (2006 - 2010)

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	65.9	0.049	0.047	0.042	0.038	0.035	0.032	0.029
2007	98.4	0.060	0.052	0.050	0.044	0.038	0.033	0.029
2008	97.7	0.060	0.047	0.044	0.038	0.036	0.031	0.027
2009	94.9	0.056	0.051	0.046	0.040	0.036	0.030	0.026
2010	95.1	0.060	0.050	0.042	0.037	0.035	0.030	0.026

Years shown in italics indicate data availability is less than 75%.

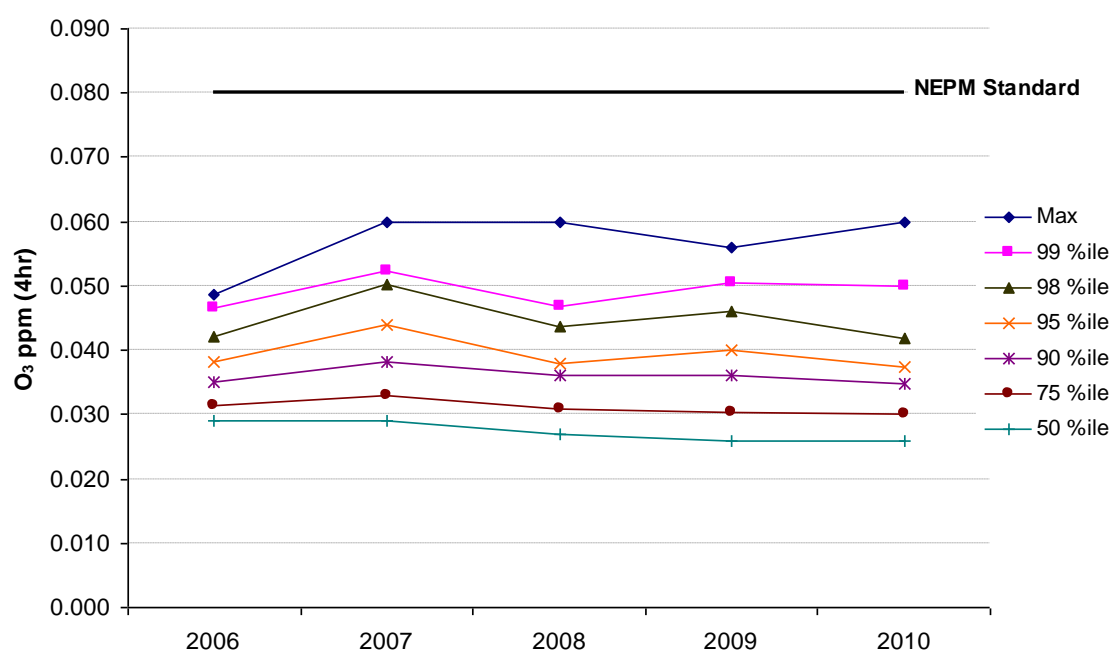


Figure 18 Percentiles of daily peak 4-hour O₃ concentrations for CHD01- Christie Downs (2006-2010)

Sulfur dioxide

Table 38 Percentiles of daily peak 1-hour SO₂ concentrations for Adelaide, NOR01- Northfield (2002 - 2010)

AAQ NEPM Standard
0.20 ppm (1-hr average)

Year yyyy	Data availability (% of hours)	Max (ppm)	Percentiles (ppm)					
			99th	98 th	95th	90th	75th	50th
2002*	15.5	0.027	0.024	0.020	0.013	0.010	0.005	0.003
2003	95.2	0.009	0.007	0.006	0.005	0.004	0.002	0.001
2004	92.6	0.012	0.007	0.006	0.004	0.003	0.001	0.001
2005	93.4	0.015	0.008	0.006	0.004	0.003	0.001	0.001
2006	94.4	0.020	0.005	0.004	0.003	0.002	0.002	0.001
2007	96.2	0.008	0.006	0.005	0.003	0.002	0.001	0.001
2008	97.3	0.009	0.006	0.005	0.004	0.002	0.001	0.001
2009	97.0	0.022	0.006	0.005	0.003	0.002	0.001	0.000
2010	96.9	0.013	0.005	0.004	0.003	0.002	0.001	0.001

*Data availability is low as monitoring began during the final quarter of 2002

Years shown in italics indicate data availability is less than 75%

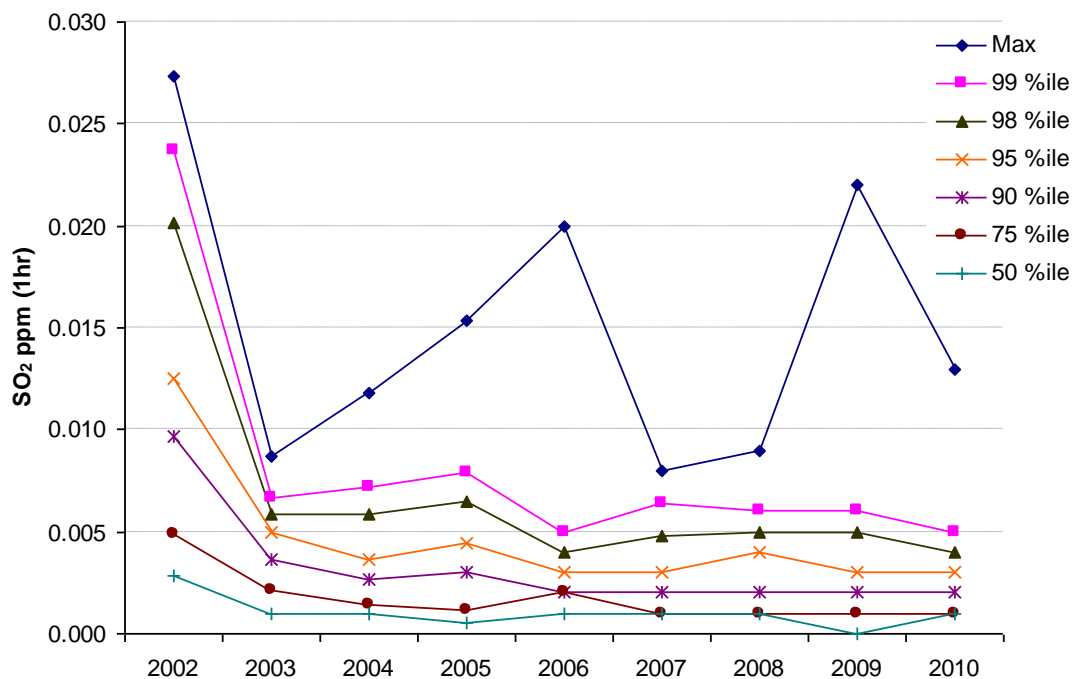


Figure 19 Percentiles of daily peak 1-hour SO₂ concentrations for NOR01-Northfield (2002-2010)

Table 39 Percentiles of daily peak 1-hour SO₂ concentrations for the Spencer Gulf, PTP01-Pt Pirie Oliver Street (2002 - 2010)

AAQ NEPM Standard
0.20 ppm (1-hr average)

Year yyyy	Data availability (% of hours)	Max (ppm)	Percentiles (ppm)					
			99th	98 th	95th	90th	75th	50th
2002	50.8	0.656	0.400	0.302	0.257	0.186	0.095	0.028
2003	95.6	0.487	0.388	0.309	0.221	0.152	0.070	0.023
2004	97.2	0.440	0.356	0.335	0.260	0.185	0.078	0.020
2005	93.6	0.721	0.391	0.362	0.234	0.186	0.105	0.042
2006	96.3	0.485	0.361	0.311	0.240	0.191	0.092	0.018
2007	97.2	0.594	0.404	0.312	0.249	0.175	0.101	0.029
2008	97.4	0.522	0.421	0.330	0.258	0.185	0.108	0.033
2009	97.8	1.260	0.467	0.367	0.238	0.174	0.093	0.024
2010	95.5	0.761	0.414	0.347	0.270	0.191	0.097	0.024

Data shown in bold type indicates an exceedence of the NEPM standard.
Years shown in italics indicate data availability is less than 75%.

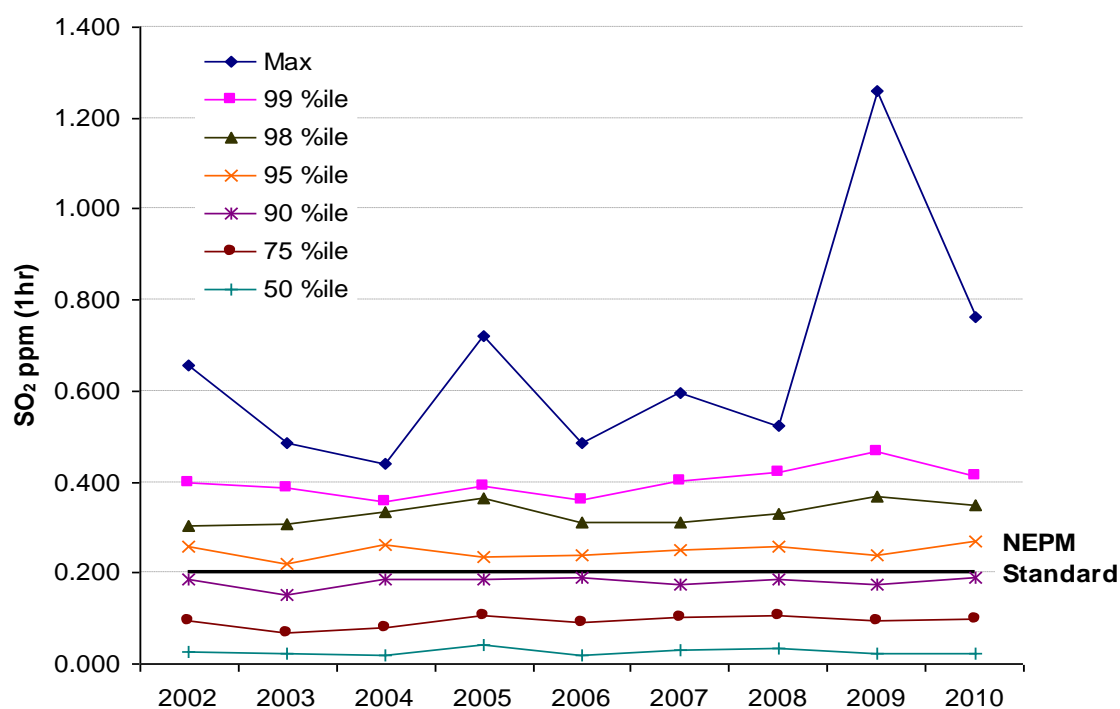


Figure 20 Percentiles of daily peak 1-hour SO₂ concentrations for the Spencer Gulf, PTP01-Port Pirie Oliver Street (2002-2010)

Table 40 Percentiles of 24-hour SO₂ concentrations for Adelaide, NOR01-Northfield (2002 - 2010)

AAQ NEPM Standard
0.08 ppm (24-hr average)

Year yyyy	Data availability (% of days)	Max (ppm)	Percentiles (ppm)					
			99th	98 th	95th	90th	75th	50th
2002*	14.8	0.007	0.006	0.005	0.005	0.004	0.002	0.001
2003	99.5	0.003	0.002	0.002	0.002	0.001	0.001	0.000
2004	95.9	0.003	0.002	0.001	0.001	0.001	0.001	0.000
2005	96.4	0.004	0.002	0.002	0.001	0.000	0.000	0.000
2006	96.4	0.003	0.002	0.001	0.001	0.001	0.000	0.000
2007	98.6	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2008	99.5	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2009	98.9	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2010	98.6	0.003	0.002	0.001	0.001	0.001	0.000	0.000

*Data availability is low as monitoring began during the final quarter of 2002 and although data availability is less than 15% data has been included for completeness; 2002 data was included in the 1-hour average SO₂ percentiles and trend summaries.

Years shown in *italics* indicate data availability is less than 75%

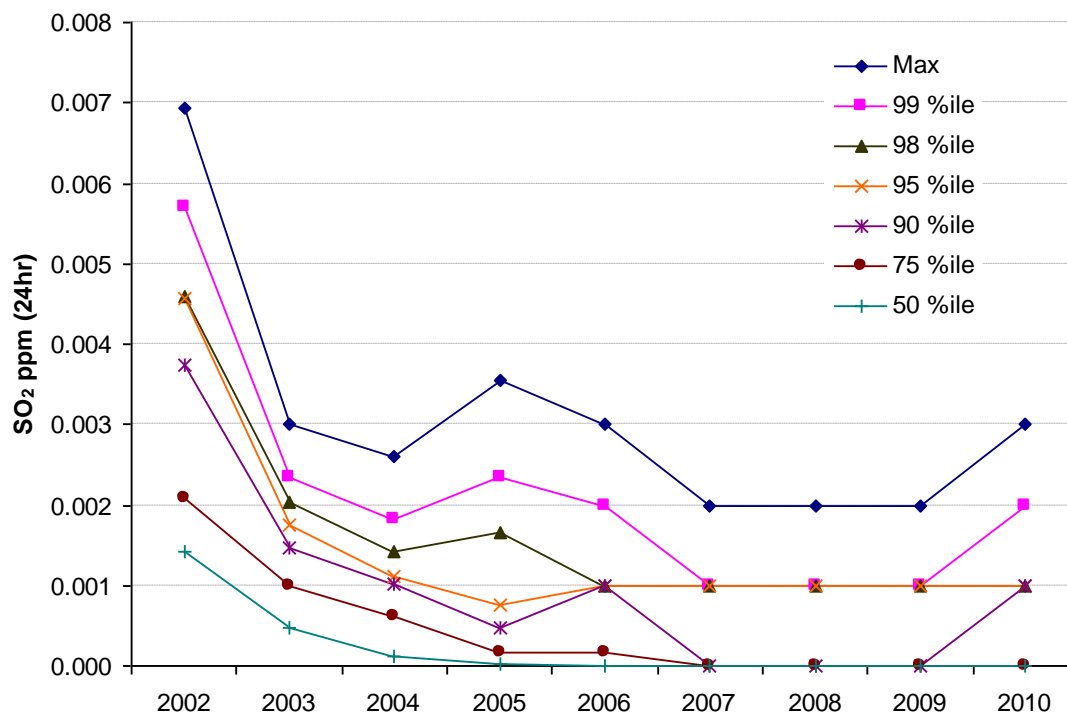


Figure 21 Percentiles of 24-hour SO₂ concentrations for Adelaide, NOR01- Northfield (2002-2010)

Table 41 Percentiles of 24-hour SO₂ concentrations for the Spencer Gulf, PTP01-Pt Pirie Oliver Street (2003 - 2010)

AAQ NEPM Standard
0.08 ppm (24-hr average)

Year yyyy	Data availability (% of days)	Max (ppm)	Percentiles (ppm)					
			99th	98 th	95th	90th	75th	50th
2002	51.5	0.050	0.045	0.040	0.035	0.029	0.013	0.005
2003	97.3	0.095	0.043	0.037	0.024	0.018	0.011	0.004
2004	99.7	0.051	0.039	0.037	0.028	0.022	0.011	0.003
2005	94.8	0.072	0.054	0.049	0.033	0.023	0.014	0.005
2006	97.8	0.053	0.043	0.040	0.032	0.023	0.013	0.002
2007	98.9	0.061	0.044	0.042	0.032	0.024	0.014	0.004
2008	99.2	0.076	0.052	0.048	0.034	0.026	0.014	0.004
2009	100.0	0.104	0.062	0.046	0.032	0.023	0.012	0.003
2010	98.6	0.046	0.039	0.037	0.028	0.022	0.010	0.003

Data shown in bold type indicates an exceedence of the NEPM standard.
Years shown in italics indicate data availability is less than 75%.

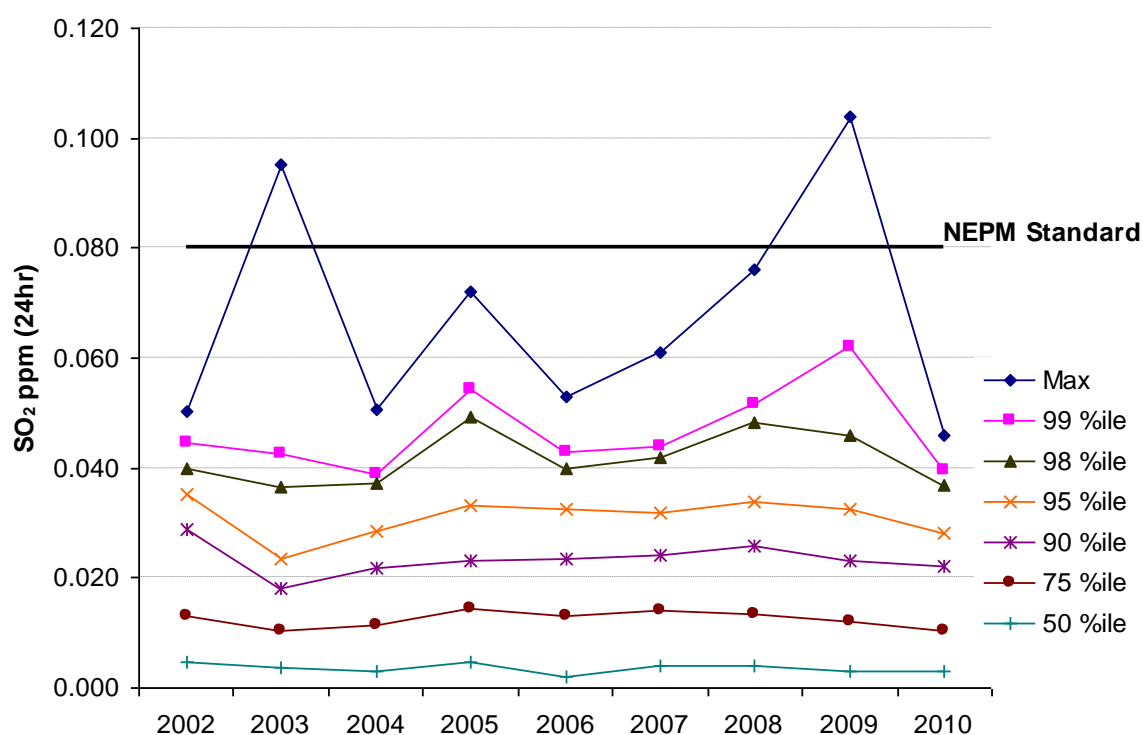


Figure 22 Percentiles of 24-hour SO₂ concentrations for the Spencer Gulf, PTP01- Port Pirie Oliver Street (2002-2010)

Particulate matter as PM₁₀

Table 42 Percentiles of daily 24-hour PM₁₀ concentrations for ELI01-Elizabeth Downs (2004 - 2010)

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

Year yyyy	Data availability rates (%)	Max (µg/m ³)	Percentiles (µg/m ³)					
			99th	98th	95th	90th	75th	50th
2004	55.5	63.9	39.1	33.5	26.8	22.3	16.1	12.4
2005	95.1	84.8	58.8	48.5	38.2	30.0	21.7	14.9
2006	91.8	90.4	49.3	44.8	30.4	23.0	17.3	13.0
2007	97.0	74.9	47.2	41.9	31.9	25.9	19.5	13.5
2008	94.3	77.5	47.4	41.8	34.5	28.5	21.5	15.9
2009	97.0	197.5	61.2	53.4	46.8	34.9	24.4	15.6
2010	96.7	209.5	41.4	33.6	26.2	21.3	17.0	13.1

Data shown in bold type indicates an exceedence of the NEPM standard.
Years shown in italics indicate data availability is less than 75%.

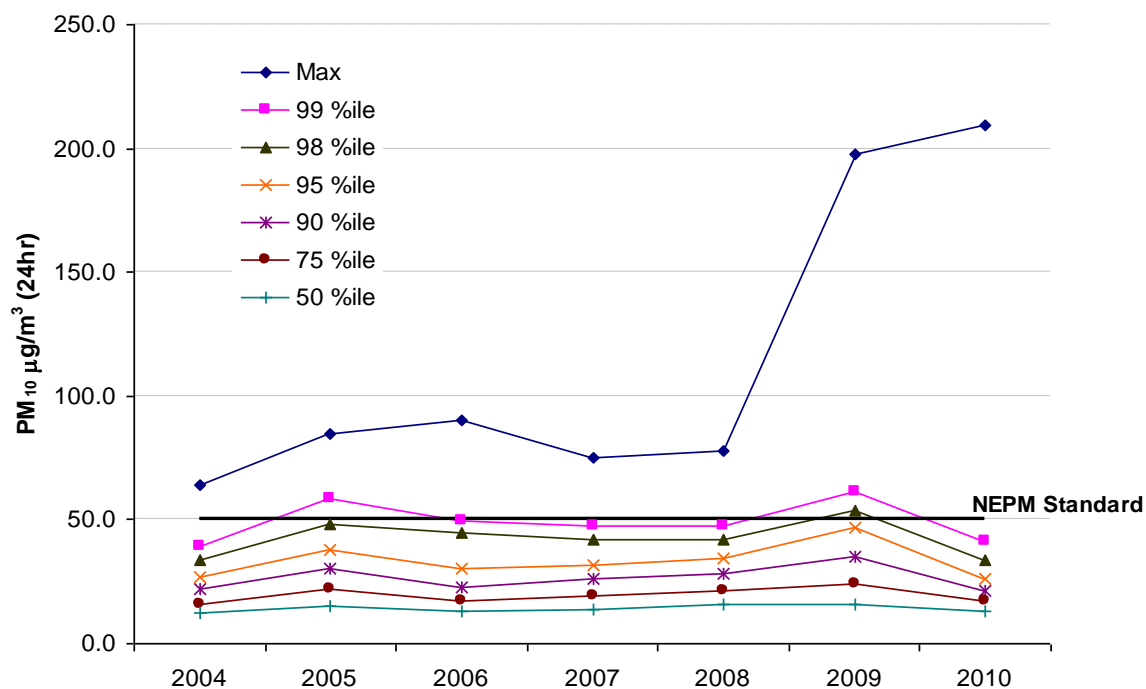


Figure 23 Percentiles of daily 24-hour PM₁₀ concentrations for ELI01 - Elizabeth Downs (2004-2010)

Table 43 Percentiles of daily 24-hour PM₁₀ concentrations for NET01-Netley (2002 - 2010)

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

Year yyyy	Data availability rates (%)	Max (µg/m ³)	Percentiles (µg/m ³)					
			99th	98th	95th	90th	75th	50th
2002	100.0	79.3	43.1	38.1	31.6	27.5	22.8	18.5
2003	97.0	119.4	54.0	46.0	33.9	29.4	22.1	17.9
2004	98.6	62.7	42.4	40.3	33.6	29.5	23.1	17.3
2005	89.9	58.7	54.5	48.1	38.3	32.3	24.3	17.9
2006	91.0	101.4	85.7	69.2	43.0	33.5	24.6	18.1
2007	95.1	125.9	80.3	57.6	37.6	31.0	23.3	17.6
2008	98.6	90.3	50.5	43.8	36.7	30.9	22.9	17.4
2009	98.9	108.7	58.2	45.7	39.6	30.3	22.8	16.8
2010	95.3	93.9	46.3	37.6	29.3	25.2	20.3	16.1

Data shown in bold type indicates an exceedence of the NEPM standard.

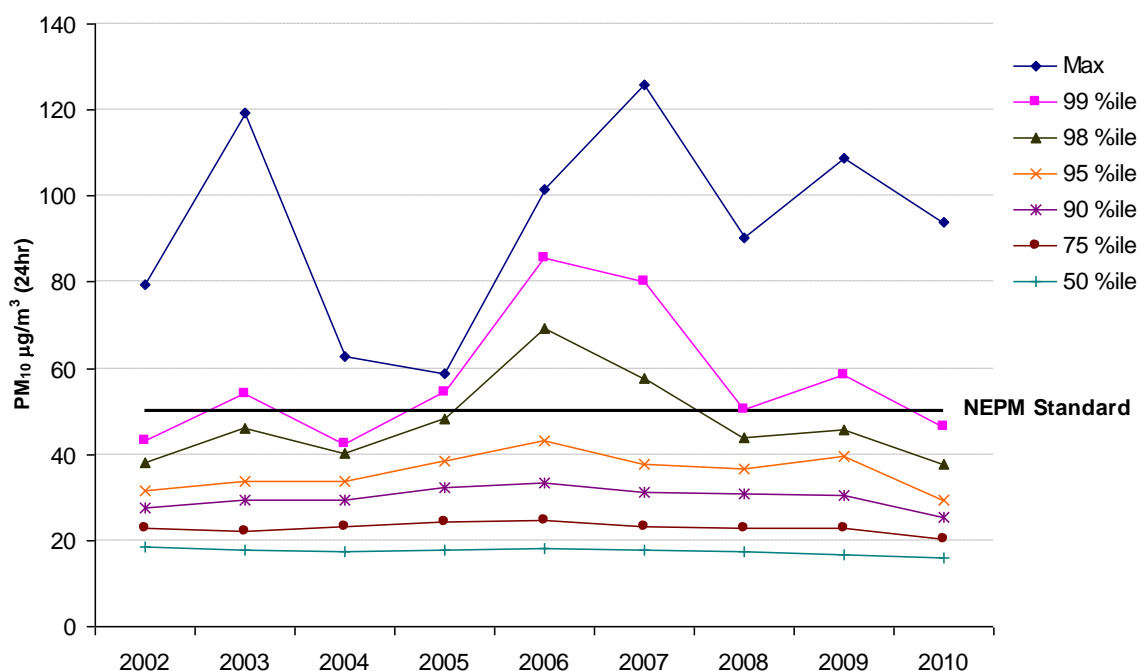


Figure 24 Percentiles of daily 24-hour PM₁₀ concentrations for NET01-Netley (2002-2010)

Table 44 Percentiles of daily 24-hour PM₁₀ concentrations for CHD01-Christie Downs (2006 - 2010)

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

Year yyyy	Data availability rates (%)	Max (µg/m ³)	Percentiles (µg/m ³)					
			99th	98th	95th	90th	75th	50th
2006	73.4	52.2	49.6	42.1	31.2	25.8	19.4	14.3
2007	92.6	70.5	43.8	38.3	31.7	27.3	21.6	15.5
2008	95.9	89.7	40.5	34.0	30.7	26.9	20.4	15.1
2009	95.3	83.9	45.8	42.8	35.9	28.5	20.9	15.5
2010	96.4	88.7	52.8	39.6	27.3	22.7	17.7	14.0

Data shown in bold type indicates an exceedence of the NEPM standard.
Years shown in italics indicate data availability is less than 75%.

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 PM₁₀ Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

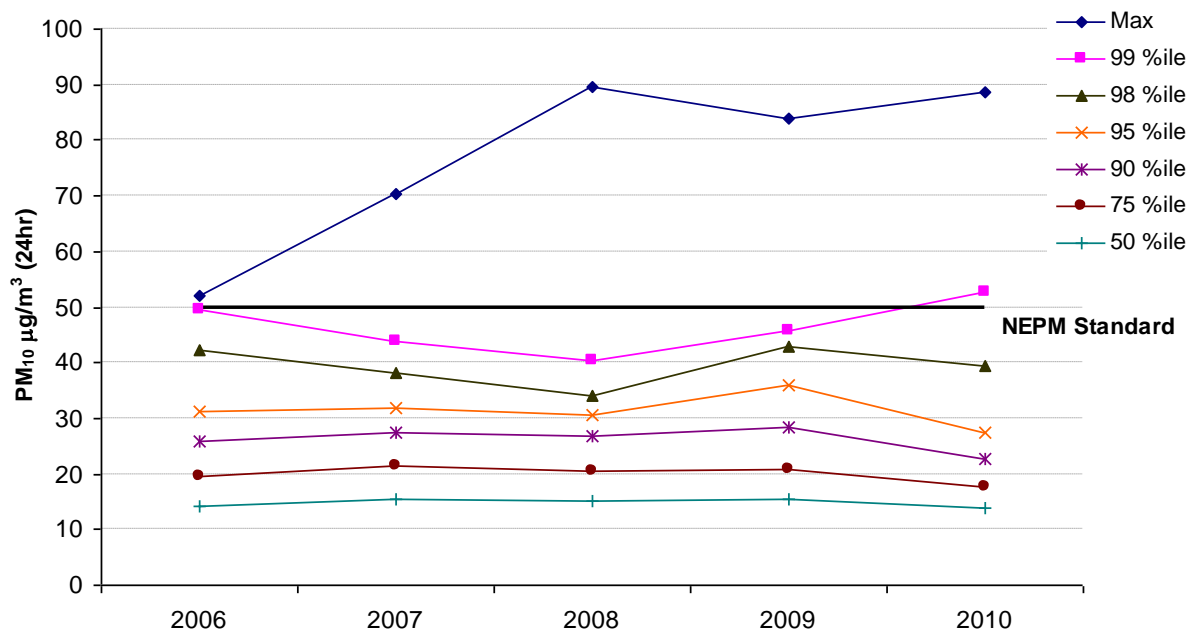


Figure 25 Percentiles of daily 24-hour PM₁₀ concentrations at CHD01- Christie Downs (2006-2010)

Table 45 Percentiles of daily 24-hour PM₁₀ concentrations for WHY07-Whyalla Schulz Park (2007 - 2010)

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

Year yyyy	Data availability rates (%)	Max (µg/m ³)	Percentiles (µg/m ³)					
			99th	98th	95th	90th	75th	50th
2007	66.8	97.2	62.8	51.0	30.5	27.4	20.5	14.9
2008	97.5	96.5	57.6	45.3	36.9	32.1	23.7	15.9
2009	96.4	283.8	70.9	52.7	41.8	35.2	26.0	16.3
2010	98.6	92.3	44.8	32.3	25.5	22.5	17.2	12.5

Data shown in bold type indicates an exceedence of the NEPM standard.
Years shown in italics indicate data availability is less than 75%.

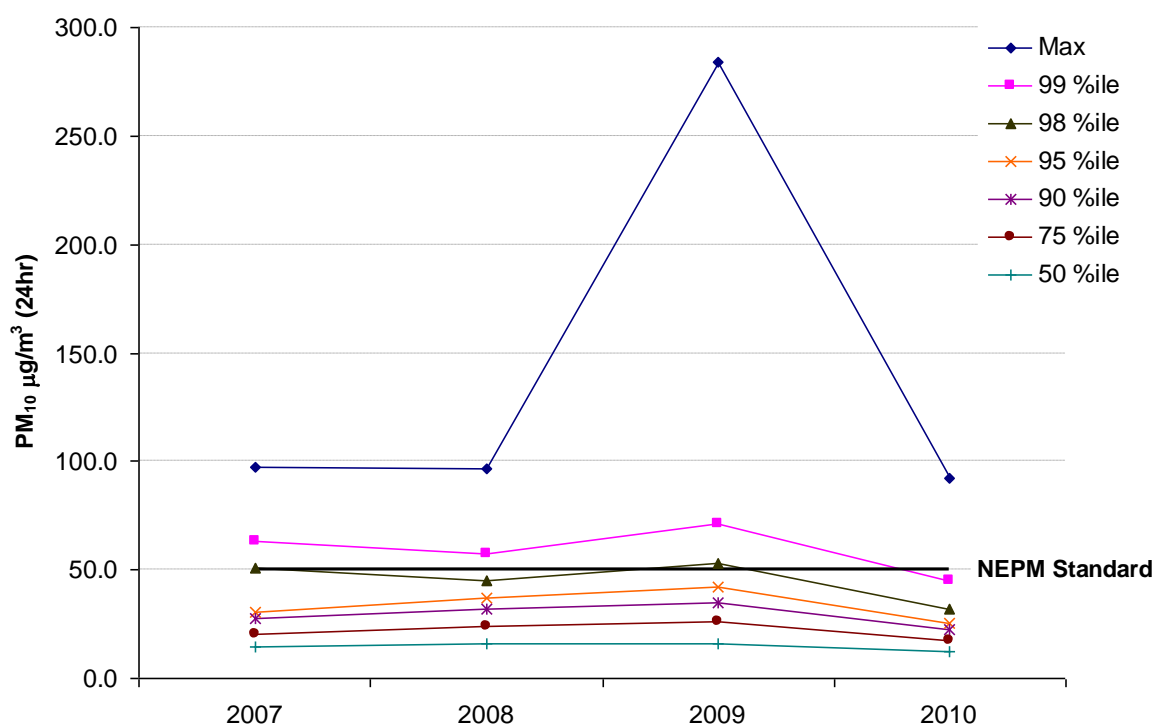


Figure 26 Percentiles and maxima of daily 24-hour PM₁₀ concentrations for WHY07- Whyalla Schulz Park (2007-2010)

Table 46 Percentiles of daily 24-hour PM₁₀ concentrations for PTP01-Pt Pirie Oliver Street (2002 - 2010)

AAQ NEPM Standard
50 µg/m³ (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	50.1	60.5	51.7	47.0	38.9	30.8	21.8	14.1
2004	97.3	135.8	51.8	43.9	35.7	28.5	22.6	15.7
2005	95.1	464.3	68.4	45.6	37.6	31.6	23.4	16.6
2006	96.2	181.8	71.0	59.3	42.9	34.6	25.1	17.4
2007	97.5	173.8	68.6	60.8	45.2	37.2	25.5	16.8
2008	97.5	235.1	83.1	64.0	48.9	39.5	25.3	15.5
2009	97.5	183.0	97.4	57.2	46.0	34.8	24.3	14.6
2010	95.9	142.9	45.4	40.6	30.6	24.9	16.8	12.3

Data shown in bold type indicates an exceedence of the NEPM standard.
Years shown in italics indicate data availability is less than 75%.

Monitoring by high-volume sampler (one in six days), otherwise monitoring is by TEOM and reported as TEOM data (NEPC 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 PM₁₀ Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

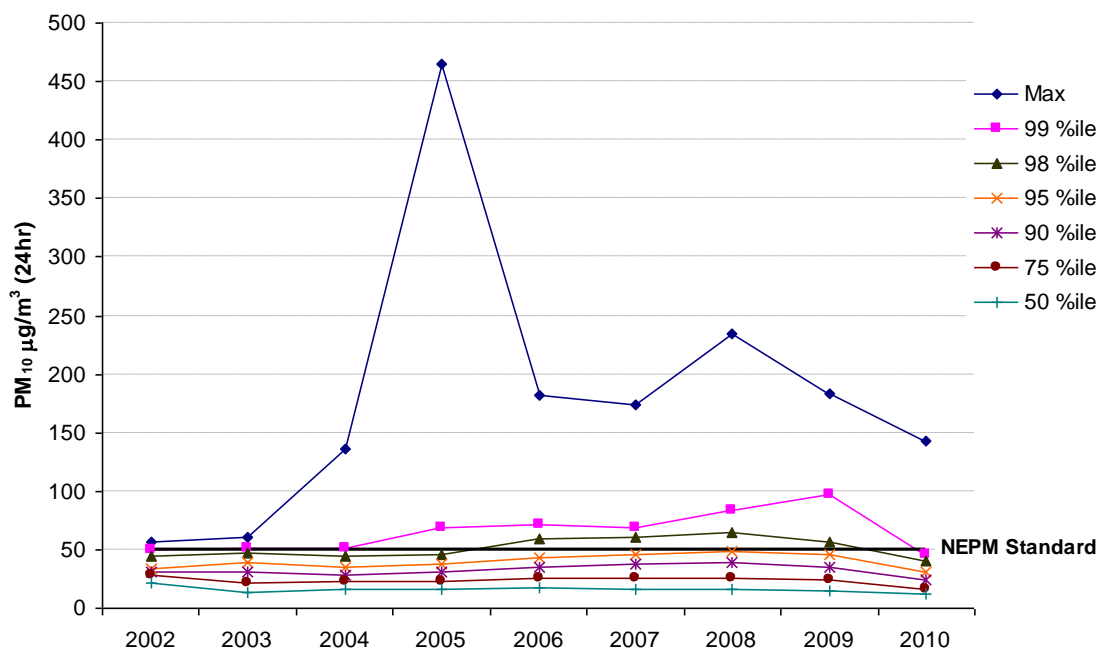


Figure 27 Percentiles and maxima of daily 24-hour PM₁₀ concentrations for PTP01- Port Pirie Oliver Street (2002-2010)

Lead

Table 47 Annual Mean Lead Concentration for PTP05-Pt Pirie Frank Green Park (2002 - 2010)

AAQ NEPM Standard 0.50 µg/m ³ (annual-hr average)		
Year yyyy	Data availability rate (% days)	Annual mean (µg/m ³)
2002	60.7	0.26
2003	93.4	0.23
2004	98.4	0.33
2005	98.4	0.30
2006	100.0	0.19
2007	98.3	0.21
2008	100.0	0.14
2009	98.4	0.19
2010	96.7	0.19

Years shown in italics indicate data availability is less than 75%.

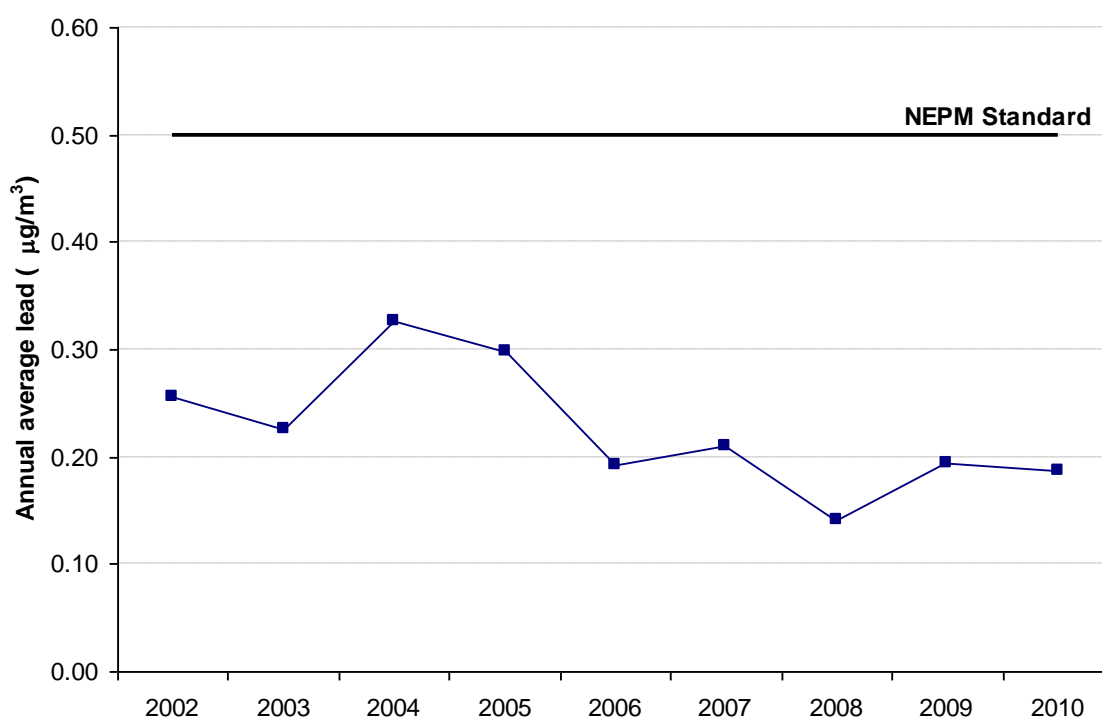


Figure 28 Annual mean lead concentration for PTP05 - Port Pirie Frank Green Park (2002-2010)

Table 48 Annual Mean Lead Concentration for PTP01-Pt Pirie Oliver Street (2002 - 2010)

AAQ NEPM Standard 0.50 µg/m³ (annual-hr average)		
Year yyyy	Data availability rate (% days)	Annual mean (µg/m³)
2002	59.0	0.62
2003	96.7	0.68
2004	98.4	0.68
2005	98.4	0.70
2006	100.0	0.56
2007	100.0	0.59
2008	95.1	0.41
2009	100.0	0.40
2010	98.4	0.23

Data shown in bold type indicates an exceedence of the NEPM standard.
Years shown in italics indicate data availability is less than 75%.

Lead data are reported to ambient conditions and analyses were carried out by NATA accredited facilities at the Queensland Health Forensic and Scientific Services laboratory (NATA accreditation no. 41).

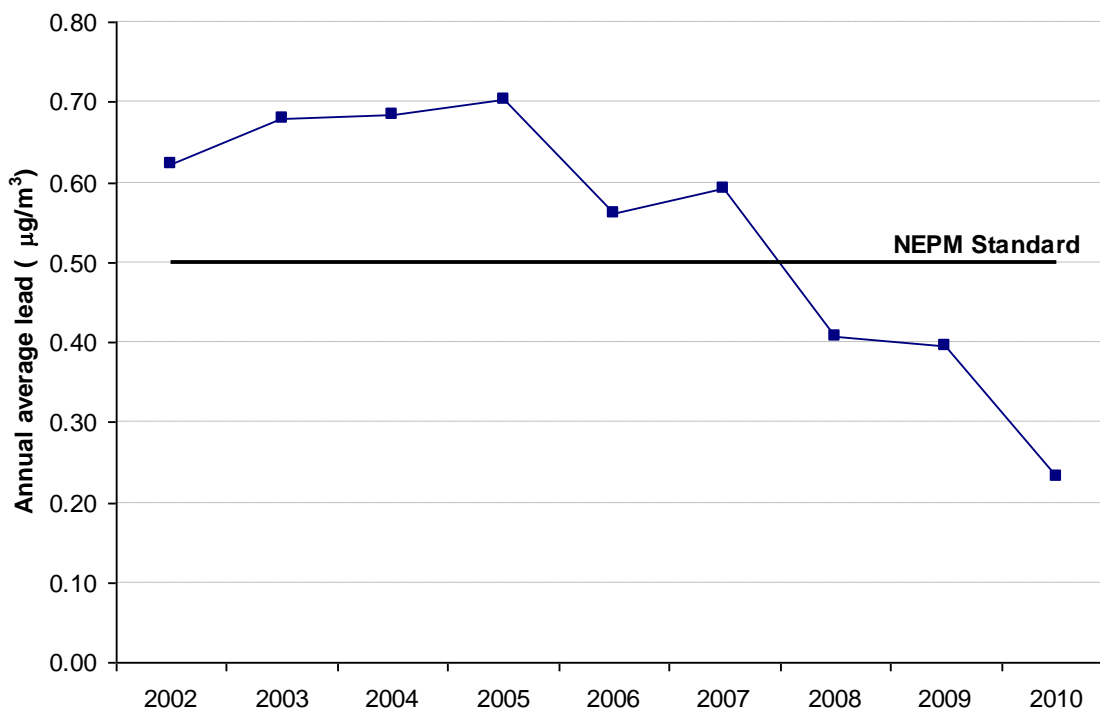


Figure 29 Annual mean lead concentration for PTP01- Port Pirie Oliver Street (2002 - 2010)

Particulate matter as PM_{2.5}

Table 49 Percentiles of daily 24-hour PM_{2.5} concentrations for NET01-Netley (2004 - 2010)

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

Year yyyy	Data availability rates (%)	Max (µg/m³)	Percentiles (µg/m³)					
			99th	98th	95th	90th	75th	50th
2005	96.4	17.3	16.4	15.0	13.2	11.6	9.4	7.3
2006	96.2	61.2	20.4	19.0	14.5	12.0	9.7	7.3
2007	99.2	21.9	14.4	13.5	12.3	11.3	9.3	7.6
2008	91.8	20.2	15.7	14.5	12.5	10.9	9.2	7.2
2009	85.5	26.8	17.9	15.2	13.5	11.9	9.6	7.6
2010	98.4	20.3	14.2	13.0	11.6	10.2	8.6	7.1

Data shown in bold type indicates an exceedence of the NEPM standard.

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 PM₁₀ Data, May 2001 to report TEOM data. This is as volatiles are not expected to be significant.

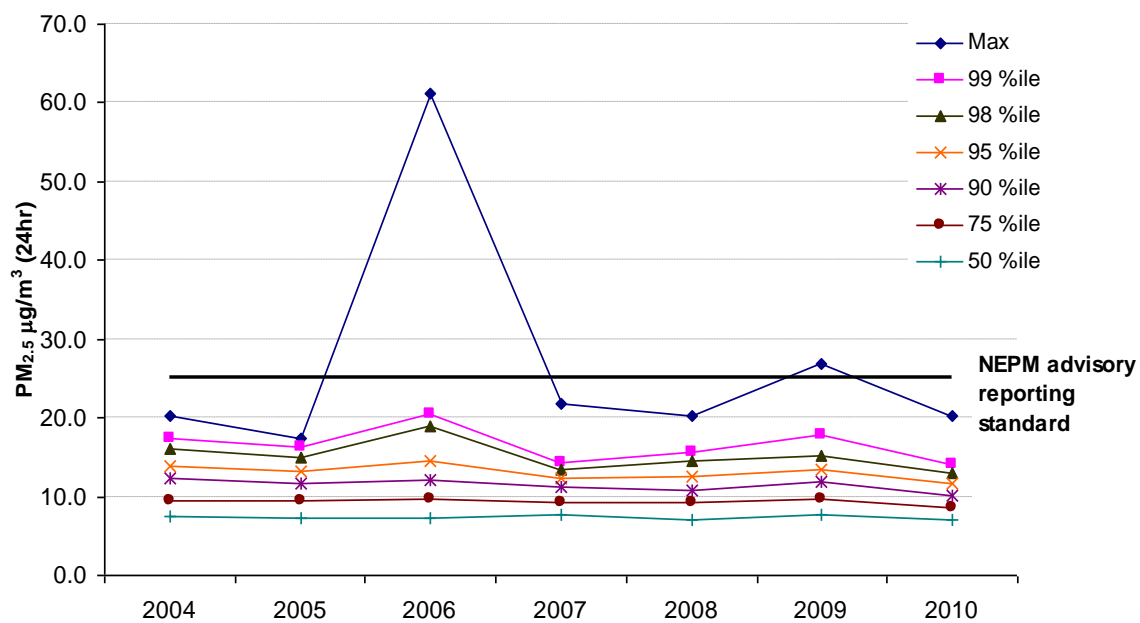


Figure 30 Percentiles of daily 24-hour PM_{2.5} concentrations for NET01-Netley (2004-2010)

Sampling and analysis methods

Carbon monoxide	AS3580.7.1 – 1992
Nitrogen oxides	AS3580.5.1 – 1993
Ozone	AS3580.6.1 – 1990
Sulfur dioxide	AS3580.4.1 – 2008
Lead*	AS2800 – 1985 Analysis using ICP
PM ₁₀	AS3580.9.8 – 2008
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 below 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.

Carbon monoxide	U95= ±0.66 ppm @ 9.0 ppm
Nitrogen oxides	U95= ±0.045 ppm @ 0.120 ppm
Ozone	U95= ±0.005 ppm @ 0.100 ppm
Sulfur dioxide	U95= ±0.011 ppm @ 0.200 ppm
Lead*	U95= ±0.09 µg/m ³ @ 5 µg/m ³ **
PM ₁₀	U95= ±1.5 µg/m ³ for 1hr average
PM _{2.5}	Using TEOM with PM ₁₀ inlet and VSCC PM _{2.5} cut-off

REFERENCES

Australian Bureau of Statistics (ABS) 2009, Census
www.abs.gov.au

National Environment Protection Council (NEPC) 2003, National Environment Protection (Ambient Air Quality) Measure: *Technical Paper on Monitoring for Particles as PM_{2.5}*, National Environment Protection Council Service Corporation.
http://www.ephc.gov.au/sites/default/files/AAQ_PM25_TP__Technical_Paper_for_Monitoring_for_Particles_Final_200303.pdf

NEPC Peer Review Committee 2001, National Environment Protection (Ambient Air Quality) Measure: Technical Paper No 5: *Data Collection and Handling*, National Environment Protection Council.
http://www.ephc.gov.au/sites/default/files/AAQPRC_TP__05_Data_Collection_200105_Final.pdf

NEPC Peer Review Committee 2010, National Environment Protection (Ambient Air Quality) Measure: Technical Paper No 8: *Annual Reports*, National Environment Protection Council.
http://www.ephc.gov.au/sites/default/files/AAQPRC_TP__08_Annual_Reports_2010_Revised_23_0910_Final.pdf

NEPC Peer Review Committee 2001, National Environment Protection (Ambient Air Quality) Measure: Technical Paper No 10: *Collection and Reporting of TEOM PM₁₀ Data*, National Environment Protection Council.
http://www.ephc.gov.au/sites/default/files/AAQPRC_TP__10_Collection_and_Reporting_200105_Final.pdf

National Environment Protection Council 2003, National Environment Protection (Ambient Air Quality) Measure (as varied).
http://www.ephc.gov.au/sites/default/files/AAQ_NEPM__Ambient_Air_Quality_NEPM_Varied_scaleplus_Final_200305_1.pdf

SA EPA 2001, *Ambient Air Quality Monitoring Plan for South Australia*, Environment Protection Authority, Adelaide.
http://www.epa.sa.gov.au/xstd_files/Air/Report/airnepm.pdf