

THE

AUSTRALIAN CAPITAL TERRITORY
2007 AMBIENT AIR QUALITY REPORT

AGAINST THE

AMBIENT AIR QUALITY
NATIONAL ENVIRONMENT PROTECTION MEASURE

JUNE 2007

Section A - Monitoring Summary

This 2007 annual report has been prepared with reference to the national Peer Review Committee's (PRC) *Technical Paper No. 8 – Annual Reports* (October 2002).

This report covers four of the six criteria pollutants, namely carbon monoxide, nitrogen dioxide, ozone and particulate matter less than 10 microns (PM₁₀). Lead monitoring ceased in 2002 with levels significantly less than the national standard and sulfur dioxide has never been measured due to a lack of industry. The report also covers particulate matter less than 2.5 microns (PM_{2.5}).

With a population of 324,034¹ Canberra only requires one performance monitoring station (PMS). In regions where only a single PMS is required, the PRC recommends that such a station be located to be generally representative of upper bound (GRUB) pollutants concentrations.

By using GRUB stations to monitor the ambient air across a region we can be reasonably sure that, if the NEPM Standards are met at those sites, then in theory most of the total population of the region would be exposed to air at or below these pollution levels. In this way the NEPM's desired environmental outcome of adequate protection of human health and well-being should be assured.

Maximums measured at the existing station at Monash are at the upper bound of levels historically recorded in Canberra and it has been designated as the ACT's NEPM PMS.

Monash is located in southern Canberra and sits centrally in the Tuggeranong Valley. The station is located on vacant land approximately 250 metres north of Isabella Drive and 150 metres west of Cockcroft Avenue.

The Monash station has been operational since 1996 and is sited in accordance with AS2922-1987 (*Ambient Air - Guide for Siting of Sampling Sites*). It is intended that this remain a permanent monitoring and trend site for the ACT.

The ACT Government monitoring network is NATA accredited. In April NATA accreditation was granted for PM_{2.5} monitoring.

¹ Source Australian Bureau of Statistics, 2006 Census Quickstats

Section B - Assessment of Compliance with Goal and Standards

Annual compliance summary for 8-hour carbon monoxide

NEPM standard - 9.0 ppm

Region/ Performance monitoring station	Data availability rates (% of hours)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
<u>Canberra</u>							
Monash	95.5	94.6	81.2	94.3	91.4	0	Met

Annual compliance summary for 1-hour and 1-year nitrogen dioxide

NEPM standard - 1hour 0.12 ppm, 1year 0.03 ppm

Region/ Performance monitoring station	Data availability rates (% of hours)					Annual mean Concentration (ppm)	Number of 1-hour exceedences (days)	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual			1- hour	1-year
<u>Canberra</u>									
Monash	89.6	94.8	89.6	95.6	92.4	0.018	0	Met	Met

Annual compliance summary for 1-hour and 4-hour ozone

NEPM standard - 1-hour 0.10 ppm , 4-hour 0.08 ppm

Region/ Performance monitoring station	Data availability rates (% of hours)					Number of exceedences (days)		Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual	1-hour	4-hour	1-hour	4-hour
<u>Canberra</u>									
Monash	95.6	95.1	95.6	95.4	95.4	0	0	Met	Met

Annual compliance summary for 24-hour PM₁₀*

NEPM standard 50 µg/m³

Region/ Performance monitoring station	Data availability rates (% of days)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
<u>Canberra</u>							
Monash	98.9	100	100	100	99.7	5	met

* TEOM data adjusted in accordance with Technical paper No. 10

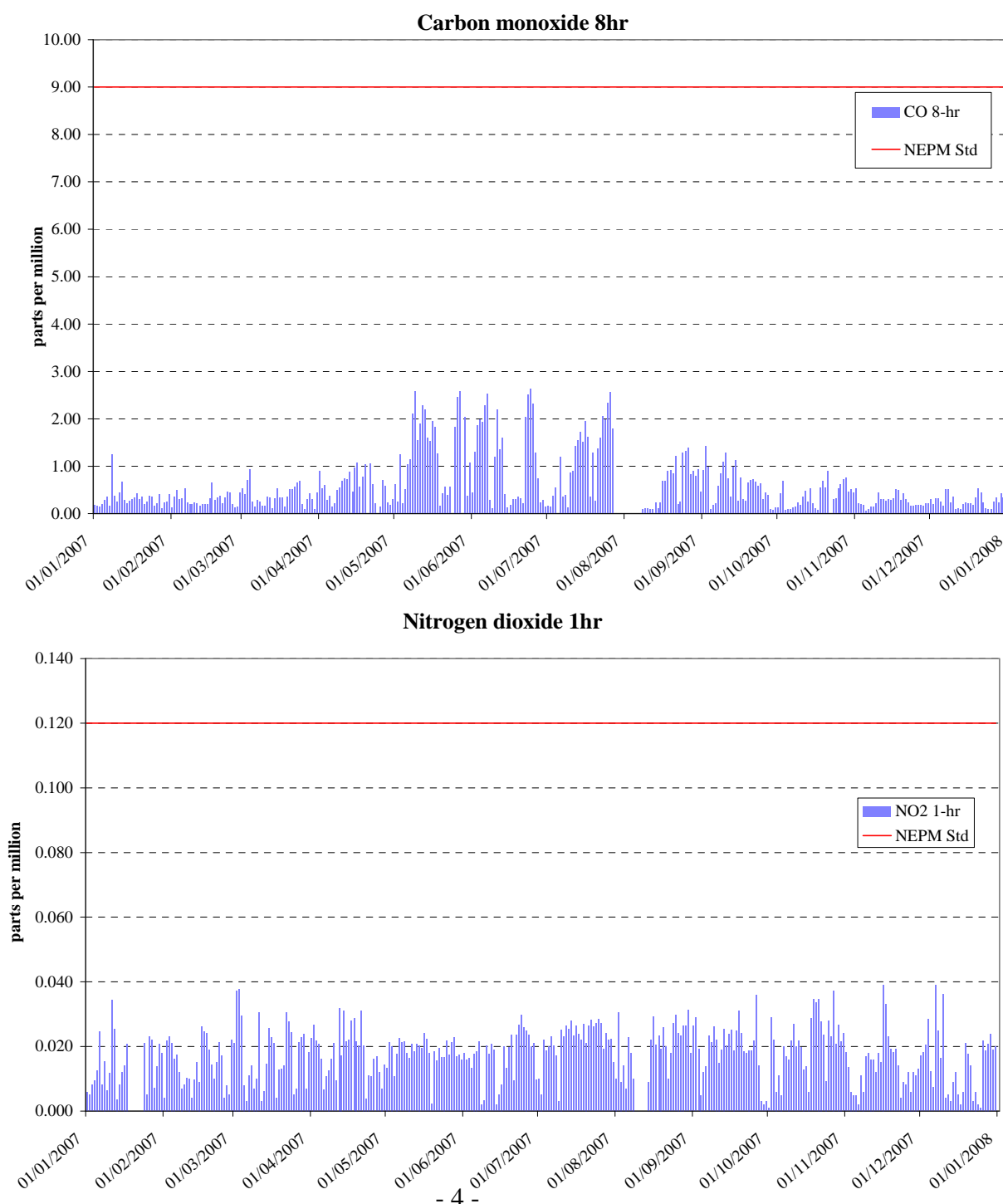
Annual compliance summary for 24-hour and 1-year PM_{2.5}*

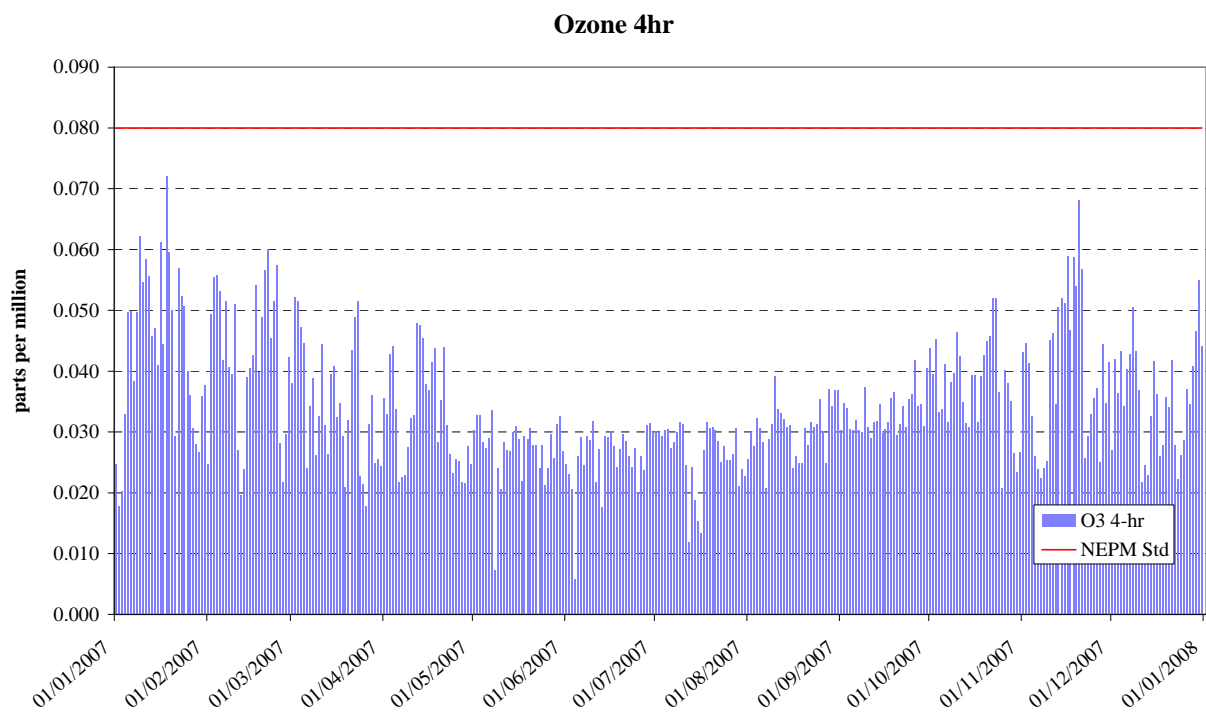
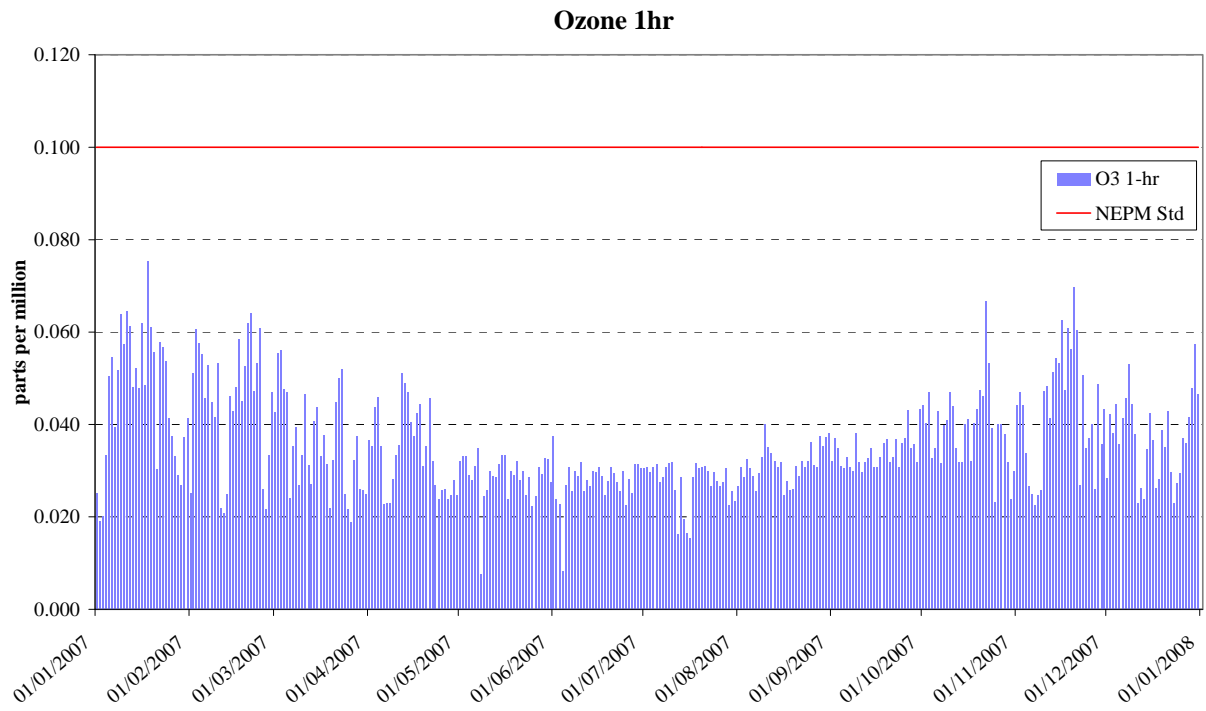
NEPM standard - 24hour 25 µg/m³, 1year 8 µg/m³

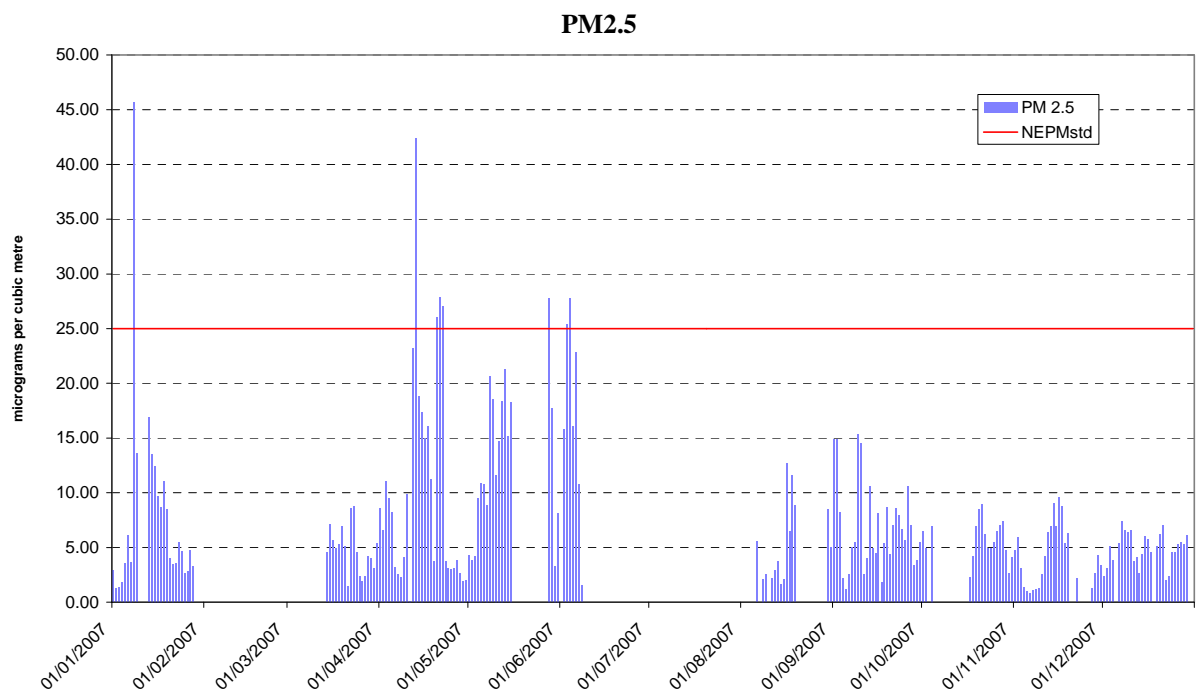
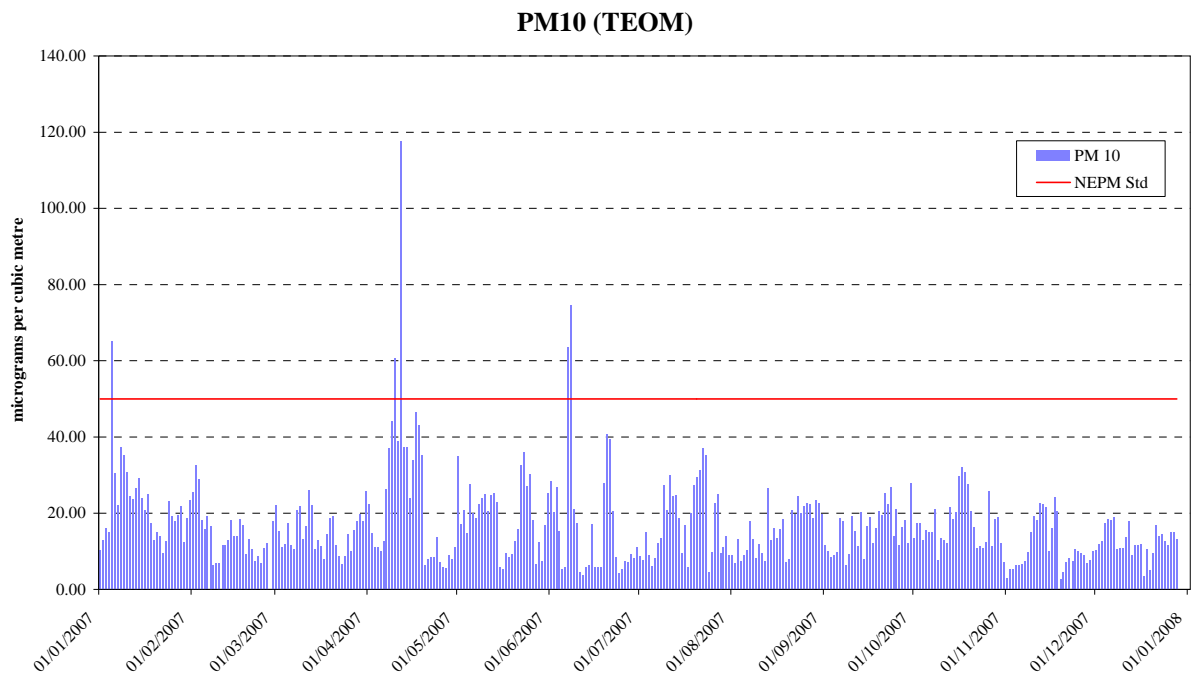
Region/ Performance monitoring station	Data availability rates (% of days)					Annual mean Concentration (µg/m ³)	Number of 24-hour exceedences (days)
	Q1	Q2	Q3	Q4	Annual		
<u>Canberra</u>							
Monash	47.8	61.5	47.8	75.0	58.0	7.5	8

* PM_{2.5} data collected prior to April has been invalidated due to the inability to meet temperature and humidity criteria in the weighing laboratory.

Daily Peak time series graphs







Section C - Analysis of Air Quality Monitoring

The ACT is making steady progress towards achieving the goal of the NEPM, which is to achieve the standards specified in Schedule 2 by June 2008. With the exception of particulate matter all measured parameters are below the standards.

Historical monitoring indicates that Canberra continues to experience elevated PM₁₀ levels during winter due to emission from domestic wood heaters. In more recent years exceedences have also been recorded from dust storms due to continuing drought conditions in the region.

During 2007 a total of 5 PM₁₀ exceedences were recorded. Wood heater emissions are usually the predominant cause of these exceedences. However this year only two exceedences were attributed to the build up of wood smoke. The ACT continues to experience elevated particle levels during winter and the Government is targeting this problem through public education, the licensing of firewood merchants, the implementation of a wood heater replacement program and on-going compliance.

The remaining three exceedences were due to bushfire or hazard reduction activities. The 5 January exceedences was due to smoke from Victorian bushfires and the 10 and 12 April exceedences were due to hazard reduction activities in and around Tumut, NSW.

The ACT Government received NATA accreditation for its PM_{2.5} monitoring in April 2007. Data collected prior April has been invalidated due to the inability to meet temperature and humidity criteria in the weighing laboratory. However the data has been analysed and included in the report for comparison against the advisory reporting standards. Data recovery is also lower this reporting period due to reliability issues with the sampling pump.

Annual summary statistics for daily peak 8-hour carbon monoxide

NEPM standard 9.0 ppm

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date/ time)	2 nd Highest (ppm)	2 nd Highest (date/ time)
<u>Canberra</u>					
Monash	348	2.6	Jun24:03	2.6	May27:02

Annual summary statistics for daily peak 1-hour nitrogen dioxide

NEPM standard 0.12 ppm

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date/ time)	2 nd Highest (ppm)	2 nd Highest (date/ time)
<u>Canberra</u>					
Monash	354	0.039	Nov16:22	0.039	Dec7:21

Annual summary statistics for daily peak 1-hour ozone

NEPM standard 0.10 ppm

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date/ time)	2 nd Highest (ppm)	2 nd Highest (date/ time)
<u>Canberra</u>					
Monash	365	0.075	Jan18:13	0.070	Nov20:15

Annual summary statistics for daily peak 4-hour ozone

NEPM standard 0.08 ppm

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date/ time)	2 nd Highest (ppm)	2 nd Highest (date/ time)
<u>Canberra</u>					
Monash	365	0.072	Jan18:16	0.068	Nov20:16

Annual summary statistics for 24-hour PM₁₀NEPM standard 50 µg/m³

Region/ Performance monitoring station	Number of valid days	Highest (µg/m ³)	Highest (date)	6 th Highest (µg/m ³)	6 th Highest (date)
<u>Canberra</u>					
Monash	364	117.7	Apr 12	46.5	Apr 20

Annual summary statistics for 24-hour PM_{2.5}NEPM standard 25 µg/m³

Region/ Performance monitoring station	Number of valid days	Highest (µg/m ³)	Highest (date)	6 th Highest (µg/m ³)	6 th Highest (date)
<u>Canberra</u>					
Monash	212	45.7	Jan 8	27.1	Apr 22

Section D – Data Analysis**Percentiles of daily peak pollutant concentration (2007)**

Pollutant	Data recovery rates (%)	Max conc. (ppm)	99 th percen tile (ppm)	98 th percen tile (ppm)	95 th percen tile (ppm)	90 th percen tile (ppm)	75 th percen tile (ppm)	50 th percen tile (ppm)
CO 8 hr	95.3	2.6	2.5	2.4	2.0	1.5	0.7	0.4
NO ₂ 1hr	97.0	0.039	0.037	0.035	0.030	0.028	0.023	0.018
Ozone 1hr	100	0.075	0.064	0.062	0.057	0.052	0.043	0.032
Ozone 4hr	100	0.072	0.061	0.059	0.054	0.050	0.040	0.032
PM ₁₀	99.7	117.7	61.8	42.5	35.3	28.0	21.0	14.9
PM _{2.5} *	58.1	45.7	27.8	27.6	20.9	15.7	8.8	5.4

* PM_{2.5} data collected prior to April has been invalidated due to the inability to meet temperature and humidity criteria in the weighing laboratory.

Daily peak 8-hour carbon monoxide data summary (1998-2007)

Year	Data Recovery (%)	No. of Exceedences (days)	Max conc. (ppm)	99 th percentile (ppm)	98 th percentile (ppm)	95 th percentile (ppm)	90 th percentile (ppm)	75 th percentile (ppm)	50 th percentile (ppm)
1998	90.5	0	5.8	4.6	4.4	3.7	2.9	1.2	0.5
1999	82.6	0	4.5	4.2	4.2	3.7	3.2	2.2	0.7
2000	79.1	0	5.8	4.5	4.4	3.7	3.0	1.7	0.7
2001	91.7	0	4.2	4.0	3.8	3.1	2.5	1.2	0.4
2002	92	0	4.3	3.7	3.4	2.9	2.3	1.2	0.4
2003	86.8	0	3.7	3.0	2.8	2.5	2.0	0.8	0.3
2004	94.1	0	3.2	2.7	2.5	2.0	1.6	0.9	0.5
2005	99.5	0	3.2	2.8	2.5	2.2	1.7	1.0	0.4
2006	99.7	0	3.7	2.8	2.6	2.2	1.8	1.1	0.4
2007	95.3	0	2.6	2.5	2.4	2.0	1.5	0.7	0.4

Daily peak Nitrogen dioxide data summary (1998-2007)

Year	Data Recovery (%)	No. of Exceedences (days)	Max conc. (ppm)	99 th percentile (ppm)	98 th percentile (ppm)	95 th percentile (ppm)	90 th percentile (ppm)	75 th percentile (ppm)	50 th percentile (ppm)
1998	70.9	0	0.045	0.039	0.034	0.030	0.028	0.023	0.016
1999	86.3	0	0.054	0.034	0.031	0.030	0.028	0.025	0.019
2000	90.0	0	0.042	0.034	0.031	0.028	0.026	0.022	0.018
2001	86.3	0	0.039	0.036	0.036	0.033	0.029	0.024	0.020
2002	88.3	0	0.045	0.036	0.034	0.031	0.026	0.022	0.017
2003	90.4	0	0.064	0.042	0.033	0.028	0.025	0.021	0.016
2004	91.8	0	0.040	0.033	0.031	0.028	0.026	0.022	0.018
2005	97.8	0	0.041	0.034	0.031	0.028	0.027	0.024	0.018
2006	98.4	0	0.044	0.036	0.033	0.031	0.029	0.024	0.019
2007	97.0	0	0.039	0.037	0.035	0.030	0.028	0.023	0.018

Daily peak 1-hour ozone data summary (1998-2007)

Year	Data Recovery (%)	No. of Exceedences (days)	Max conc. (ppm)	99 th percentile (ppm)	98 th percentile (ppm)	95 th percentile (ppm)	90 th percentile (ppm)	75 th percentile (ppm)	50 th percentile (ppm)
1998	82.5	0	0.075	0.034	0.032	0.031	0.028	0.0221	0.018
1999	87.5	0	0.069	0.061	0.055	0.045	0.039	0.030	0.024
2000	57.9	0	0.054	0.047	0.044	0.041	0.032	0.027	0.022
2001	81.5	0	0.062	0.044	0.041	0.038	0.034	0.030	0.026
2002	93.5	0	0.063	0.055	0.052	0.047	0.042	0.032	0.024
2003	92.4	0	0.102	0.069	0.061	0.050	0.045	0.035	0.025
2004	94.1	0	0.064	0.56	0.054	0.048	0.044	0.038	0.030
2005	97.8	0	0.065	0.058	0.053	0.045	0.041	0.034	0.030
2006	99.7	0	0.067	0.060	0.057	0.052	0.049	0.040	0.032
2007	100	0	0.075	0.064	0.062	0.057	0.052	0.043	0.032

Daily peak 4-hour ozone data summary (1998-2005)

Year	Data Recovery (%)	No. of Exceedences (days)	Max conc. (ppm)	99 th percentile (ppm)	98 th percentile (ppm)	95 th percentile (ppm)	90 th percentile (ppm)	75 th percentile (ppm)	50 th percentile (ppm)
1998	82.5	0	0.038	0.033	0.031	0.028	0.026	0.021	0.017
1999	87.5	0	0.063	0.054	0.046	0.042	0.036	0.029	0.024
2000	57.9	0	0.047	0.043	0.041	0.035	0.030	0.026	0.019
2001	81.5	0	0.051	0.041	0.038	0.035	0.032	0.028	0.024
2002	93.5	0	0.058	0.051	0.049	0.044	0.039	0.031	0.023
2003	92.4	1	0.082	0.063	0.058	0.048	0.043	0.033	0.025
2004	94.1	0	0.060	0.053	0.051	0.045	0.042	0.036	0.029
2005	97.5	0	0.062	0.054	0.049	0.044	0.039	0.033	0.029
2006	99.7	0	0.061	0.056	0.055	0.050	0.046	0.038	0.031
2007	100	0	0.072	0.061	0.059	0.054	0.050	0.040	0.032

Daily peak PM10 data summary (1999-2005)

Year	Data Recovery (%)	No. of Exceedences (days)	Max conc. (ppm)	99 th percentile (ppm)	98 th percentile (ppm)	95 th percentile (ppm)	90 th percentile (ppm)	75 th percentile (ppm)	50 th percentile (ppm)
1999	9.0	4	65.11	65.0	64.9	63.6	51.3	37.7	21.1
2000	15.3	1	56.4	52.6	49.4	47.6	42.4	23.1	14.5
2001	15.9	4	70.6	66.1	61.9	56.2	45.6	25.0	13.9
2002	75	0	108.4	56.6	48.5	42.4	37.7	25.3	16.2
2003	97.5	13	350.4	136.4	105.3	39.6	30.3	21.2	14.6
2004	99.7	3	52.0	48.2	46.0	33.8	28.5	20.7	14.7
2005	97.5	10	98.8	57.6	52.7	37.3	31.0	21.2	14.5
2006	83.8	4	55.2	51.0	44.9	33.9	28.3	22.7	16.9
2007	99.7	5	117.7	61.8	42.5	35.3	28.0	21.0	14.9

Daily peak PM2.5 data summary (1992-2005)

Year	Data Recovery (%)	No. of Exceedences (days)	Max conc. (ppm)	99 th percentile (ppm)	98 th percentile (ppm)	95 th percentile (ppm)	90 th percentile (ppm)	75 th percentile (ppm)	50 th percentile (ppm)
2004	93.1	15	38.3	35.8	31.5	23.5	16.6	9.5	6.2
2005	73.6	14	38.6	31.4	29.3	25.0	20.7	9.0	4.9
2006	83.3	20	46.9	35.6	33.3	27.8	15.6	8.7	5.8
2007	58.1	8	45.7	27.8	27.6	20.9	15.7	8.8	5.4

Daily peak data summary graphs

