

THE

AUSTRALIAN CAPITAL TERRITORY
2005 AMBIENT AIR QUALITY REPORT

AGAINST THE

AMBIENT AIR QUALITY
NATIONAL ENVIRONMENT PROTECTION MEASURE

JUNE 2006

Section A - Monitoring Summary

This 2005 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, 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 322,492¹ 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 approximately 250 metres north of Isabella Drive and 150 metres west of Cockcroft Avenue on vacant land.

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.

¹ Source Australian Bureau of Statistics, Publication number 3218.0 Regional Population Growth, Friday 22 March 2004

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	96	95.3	95.5	95.4	95.5	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	94.3	88.2	95.5	94.3	93.1	0.017	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	95.7	91.7	92.6	95.5	93.8	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	91.2	100	100	97.5	10	not met

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

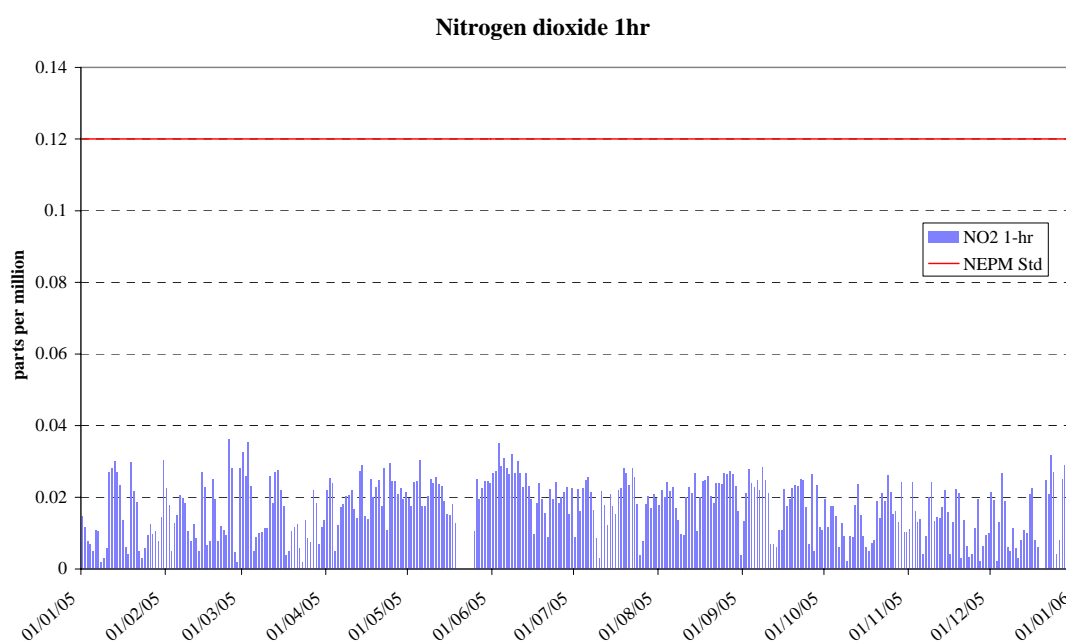
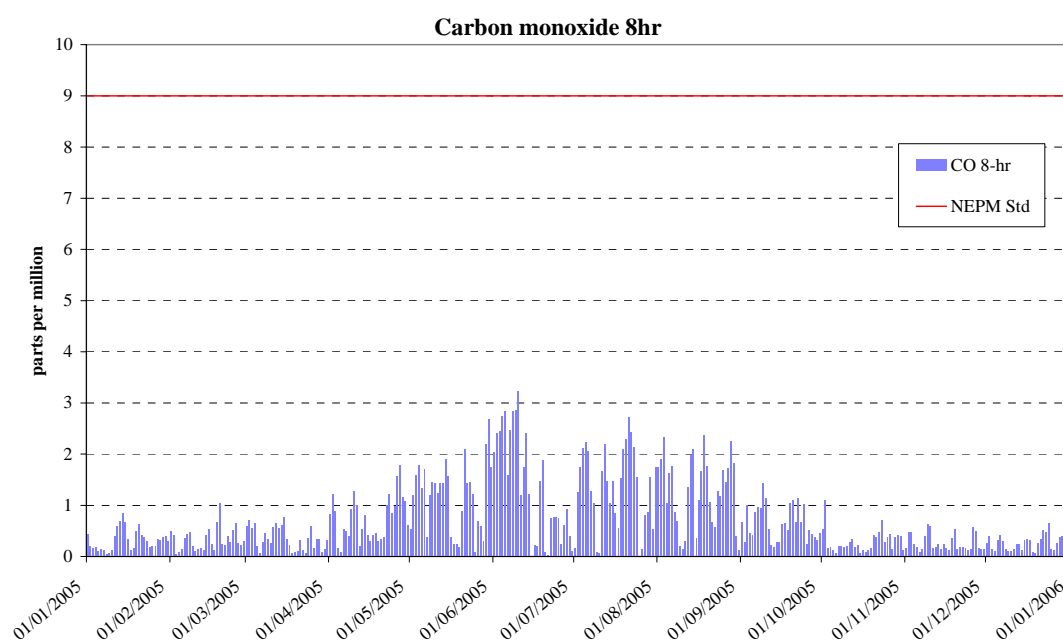
Annual compliance summary for 24-hour and 1-year PM_{2.5}*

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

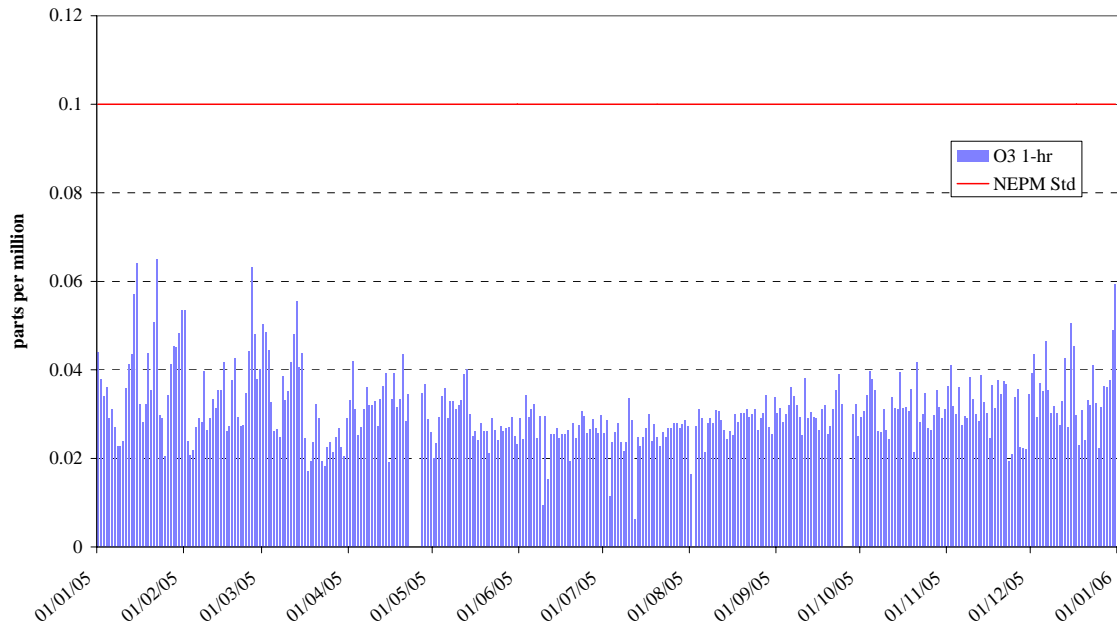
Region/ Performance monitoring station	Data availability rates (% of days)					Annual mean Concentration (µg/m ³)	Number of 24-hour exceedences (days)
	Q1	Q2	Q3	Q4	Annual		
<u>Canberra</u>							
Monash	93.4	85.7	50.0	65.9	73.6	7.7	14

* All PM_{2.5} data has been invalidated due to a failure to meet filter conditioning criteria.

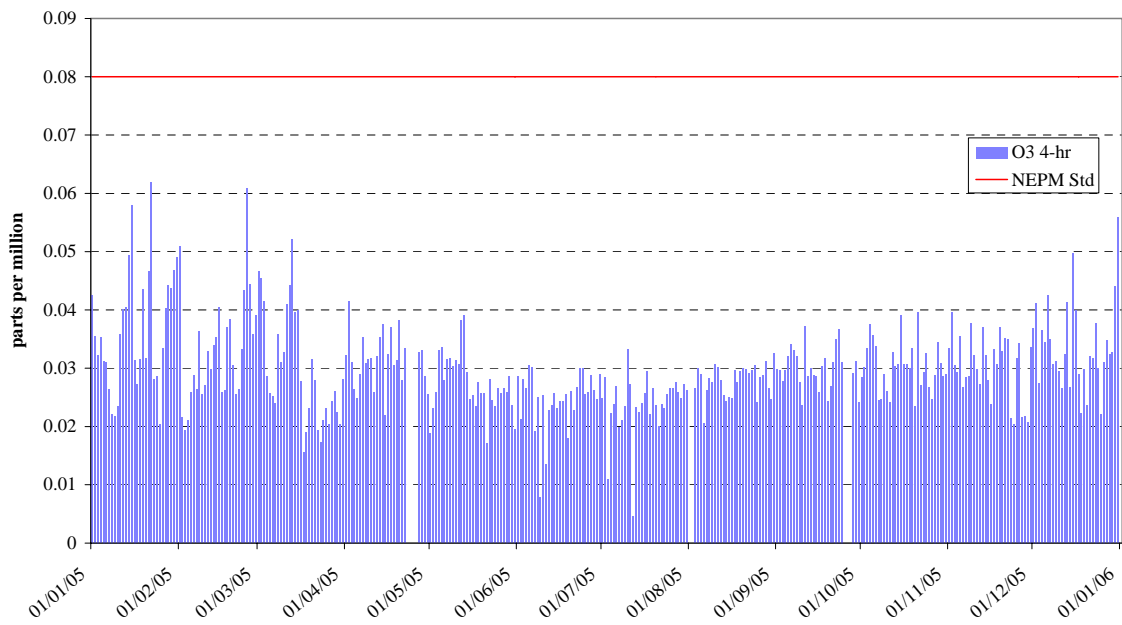
Daily Peak time series graphs



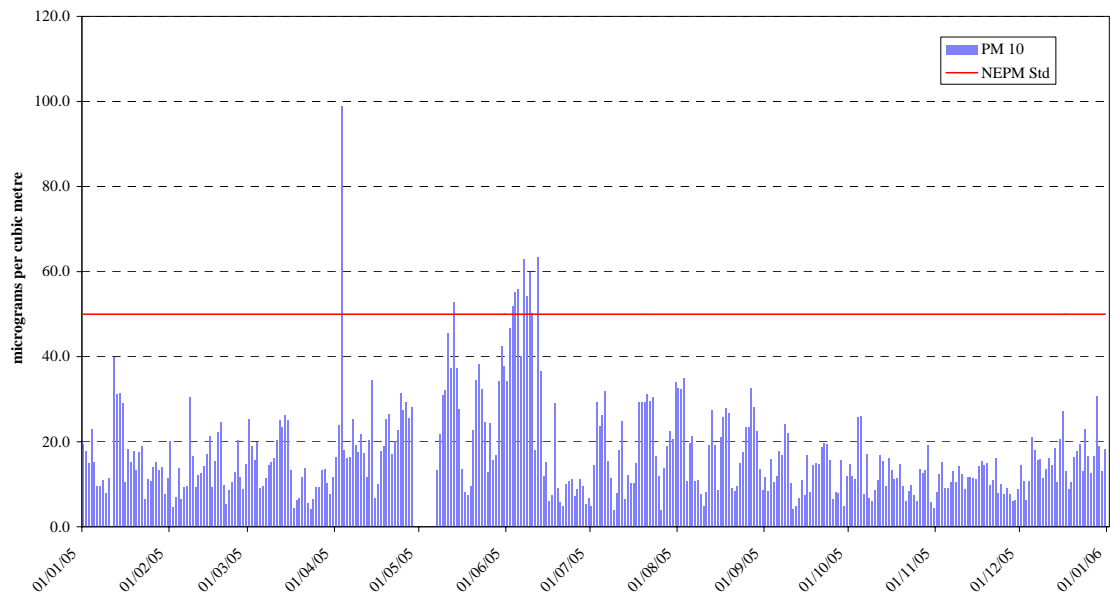
Ozone 1hr

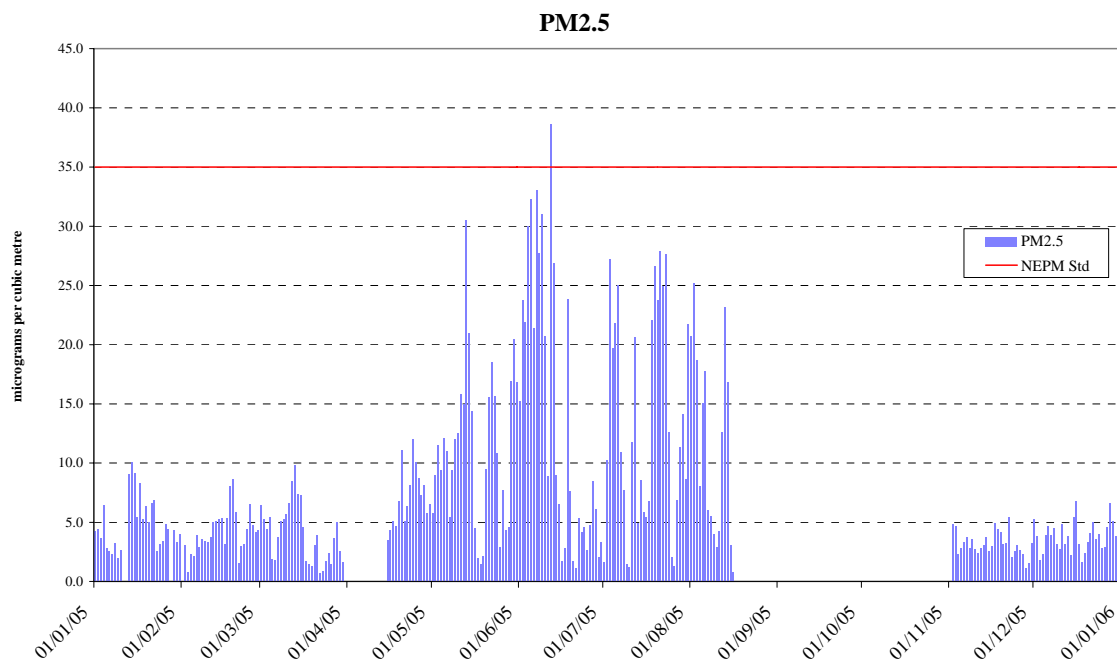


Ozone 4hr



PM10 (TEOM)





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 PM₁₀ all measured parameters are well 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 2005 a total of 10 PM₁₀ exceedences were recorded. Only two of these were not attributed to the build up of wood smoke under stable atmospheric conditions. The ACT Government is targeting this problem through public education, the licensing of firewood merchants and the implementation of a wood heater replacement program.

The remaining two were due to a dust storm on the 3rd of April and unfavourable meteorological conditions on the 13th of May bringing smoke from a prescribed burn in the southern half of the ACT into Canberra.

All PM_{2.5} data collected during the reporting period has been invalidated due to a failure to meet filter conditioning criteria. However the data has been analysed and included in the report for comparison against the advisory reporting standards. Due to OH&S concerns ACT Health staff were also unable to access rooftop monitoring instruments between 17 August and 11 November.

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	363	3.2	Jun10:02	2.9	Jun9:23

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	357	0.041	Dec31:21	0.036	Feb24:21

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	357	0.065	Jan22:13	0.064	Jan 15:12

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	358	0.062	22 Jan:15	0.061	25 Feb:15

Annual summary statistics for 24-hour PM₁₀

NEPM 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	98.8	3 Apr	55.1	4 Jun

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	269	38.6	12 June	30.1	4 June

Section D – Data Analysis

Percentiles of daily peak pollutant concentration (2005)

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	99.5	3.2	2.8	2.5	2.2	1.7	1.0	0.4
NO ₂ 1hr	97.8	0.041	0.034	0.031	0.028	0.027	0.024	0.018
Ozone 1hr	97.8	0.065	0.058	0.053	0.045	0.041	0.034	0.030
Ozone 4hr	97.5	0.062	0.054	0.049	0.044	0.039	0.033	0.029
PM ₁₀	97.5	98.8	57.6	52.7	37.3	31.0	21.2	14.5
PM _{2.5} *	73.6	38.6	31.4	29.3	25.0	20.7	9.0	4.9

* All PM_{2.5} data has been invalidated due to a failure to meet filter conditioning criteria.

Daily peak 8-hour carbon monoxide 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	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

Daily peak Nitrogen dioxide 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	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

Daily peak 1-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	0.075	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

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

Daily peak PM10 data summary (1999-2005)

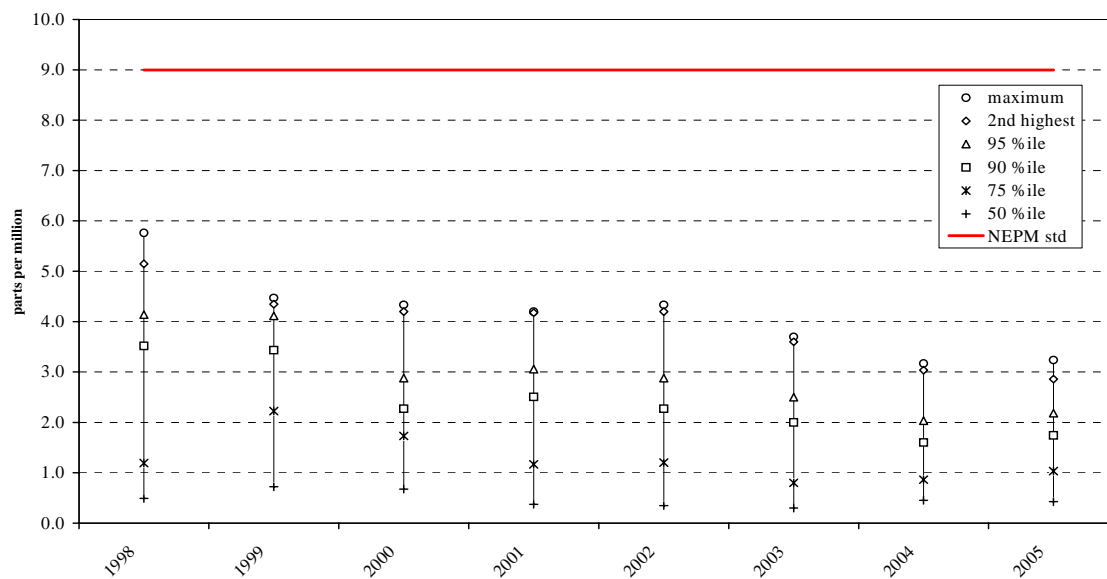
Year	Data Recovery (%)	No. of Exceedences (days)	Max conc. (ppm)	99 th percentile (ppm)	98 th percentile (ppm)	95 th percentile (ppm)	90 th percentile (ppm)	75 th percentile (ppm)	50 th percentile (ppm)
1999	9.0	4	65.11	65.0	64.9	63.6	51.3	37.7	21.1
2000	15.3	1	56.4	52.6	49.4	47.6	42.4	23.1	14.5
2001	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

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

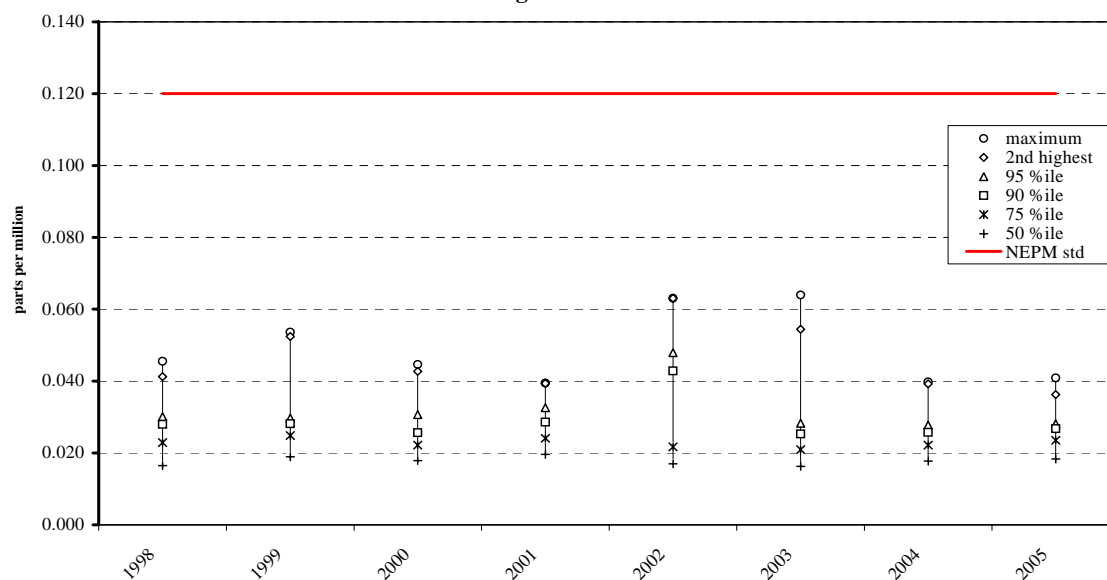
Year	Data Recovery (%)	No. of Exceedences (days)	Max conc. (ppm)	99 th percentile (ppm)	98 th percentile (ppm)	95 th percentile (ppm)	90 th percentile (ppm)	75 th percentile (ppm)	50 th percentile (ppm)
2004	93.1	15	38.3	35.8	31.5	23.5	16.6	9.5	6.2
2005	73.6	14	38.6	31.4	29.3	25.0	20.7	9.0	4.9

Daily peak data summary graphs

Carbon monoxide 8hr



Nitrogen dioxide 1hr



Ozone 1hr

