Queensland

2005 air monitoring report

This report fulfils the annual reporting requirements for Queensland under clause 18 of the National Environment Protection (Ambient Air Quality) Measure

Environment technical report No. 60

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Summary

Air monitoring at National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM) monitoring stations in Queensland between January and December 2005 indicated that exceedences of the AAQ NEPM standards occurred for:

- 1-hour and 24-hour sulfur dioxide at the Menzies site in Mount Isa due to industrial emissions; and
- 24-hour particles with an aerodynamic diameter less than 10µm (PM_{10}) at all monitoring sites in south-east Queensland, Toowoomba, Gladstone, Mackay and Townsville due to a dust storm, the Flinders View site due to smoke from grassfires and the West Mackay site due to smoke from agricultural burning and bushfires and dust-generating activities at a nearby commercial premises.

The AAQ NEPM 2008 goal was met in all regions during 2005, with the exception of:

- 24-hour PM_{10} at the West Mackay site due to a dust storm, agricultural burning, bushfire smoke and dust-generating activities at a nearby commercial premises; and
- 1-hour and 24-hour sulfur dioxide at the Menzies site in Mount Isa due to industrial emissions.

Compliance with the standards and the 2008 goal could not be demonstrated for sulfur dioxide at the Pimlico and Menzies monitoring stations because data availability was below the level required to make a valid assessment.

Scheduled campaign monitoring in Mackay (ozone and nitrogen dioxide), Cairns (ozone, nitrogen dioxide and PM_{10}), Rockhampton (ozone, nitrogen dioxide, sulfur dioxide and PM_{10}) and Bundaberg (ozone, nitrogen dioxide and PM_{10}) has been deferred pending the results of campaign monitoring in Townsville and AAQ NEPM Peer Review Committee modelling studies.

Introduction

Under clause 18 of the AAQ NEPM, jurisdictions are required to submit an annual report on their compliance with the measure in an approved form by the end of June of the year following the reporting year. The National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 8, "Annual Reports" (available from *www.ephc.gov.au*) details the format and data requirements of the annual report.

This report documents compliance information for Queensland for 2005 in accordance with the requirements of technical paper No. 8. The report is divided into four sections as follows:

Section A: Overview of the AAQ NEPM monitoring network and related activities during 2005.

Section B: Assessment of compliance with the AAQ NEPM Standards and Goals.

Section C: Assessment of monitoring data against the standards (including details of exceedences and the circumstances which led to these exceedences, and information on the highest values measured for all pollutants and regions).

Section D: Data analysis (including pollutant distribution summaries and selected multi-year data for trend stations).

Additional information on the circumstances which led to exceedences of standards during 2005 are provided in an appendix.

Section A – Monitoring summary

Queensland's ambient air monitoring plan (available from *www.epa.qld.gov.au/environmental_management/air/air_quality_monitoring/national_measures*) outlines the monitoring to be undertaken in Queensland to determine compliance with the Standards and 2008 Goal of the AAQ NEPM. It should be noted that this monitoring is only a part of the overall air monitoring network operated by the EPA. Details of AAQ NEPM monitoring and related activities in Queensland during 2005 follow.

Current AAQ NEPM monitoring stations

During 2005 monitoring was conducted in six of the ten regions identified in the Queensland monitoring plan – south-east Queensland (consisting of four sub-regions), Toowoomba, Gladstone, Mackay, Townsville and Mount Isa. Monitoring site locations are shown in figure 1.

Table 1 contains a descriptive summary of each monitoring site. In line with the descriptions contained in the AAQ NEPM, sites are identified as:

- Performance monitoring station (PMS) – nominated location to measure achievement against the goal of the AAQ NEPM.
- Trend station – nominated location to measure long-term changes in air quality in addition to achievement against the goal of the AAQ NEPM.
- Campaign station – short-term investigation location (operational for a minimum of one

calendar year) to assess the need for ongoing monitoring in the region to measure achievement against the goal of the AAQ NEPM.

Sites are further characterised using the population coverage descriptors contained in the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 3, "Monitoring Strategy" (available from *www.ephc.gov.au*):

- Generally representative upper bound (GRUB) – indicative of pollutant concentrations in the upper range of levels occurring in populated areas in the region.
- Population-average – indicative of air quality experienced by most of the population.

Exposed population is a qualitative measure of the population density in the vicinity of the monitoring station.

Figure 1: 2005 AAQ NEPM monitoring station locations

Table 1: 2005 Queensland AAQ NEPM monitoring sites

Site	Station type	Established	Pollutants monitored	Monitoring techniques	Exposed population	Non-conformance with AS2922 siting criteria	Major pollutant sources
South-east Queensland *North Coast sub-region*							
Mountain Creek	PMS - GRUB	July 2001	Ozone Nitrogen dioxide PM_{10}	AS3580.6.1-1990 AS3580.5.1-1993 AS3580.9.8-2001	Medium	Nil	Major roads Forestry/agricultural burning
Brisbane sub-region							
Deception Bay	Trend - GRUB	June 1994	Ozone Nitrogen dioxide	AS3580.6.1-1990 AS3580.5.1-1993	Medium	Trees within 20m west of site	Major roads
Woolloongabba	Trend – Peak	June 1998	Carbon monoxide	AS3580.7.1-1992	High	Nil	Major roads
Rocklea	Trend - GRUB	April 1994	Ozone Nitrogen dioxide PM_{10} $PM_{2.5}$ $PM_{2.5}$	AS3580.6.1-1990 AS3580.5.1-1993 AS3580.9.8-2001 Reference method (Partisol sequential air sampler) TEOM, based on AS3580.9.8-2001	High	Nil	Major roads

Table 1: 2005 Queensland AAQ NEPM monitoring sites (continued)

Site	Station type	Established	Pollutants monitored	Monitoring techniques	Exposed population	Non-conformance with AS2922 siting criteria	Major pollutant sources
South-east Queensland *Brisbane sub-region (continued)*							
Springwood	PMS - population average	March 1999	Ozone Nitrogen dioxide Sulfur dioxide PM_{10} $PM_{2.5}$ $PM_{2.5}$	Differential Optical Absorption Spectroscopy Differential Optical Absorption Spectroscopy Differential Optical Absorption Spectroscopy AS3580.9.8-2001 Reference method (Partisol sequential	High	Nil	Major roads
Ipswich sub-region							
Flinders View	Trend - GRUB	January 1993	Ozone Nitrogen dioxide Sulfur dioxide PM_{10}	AS3580.6.1-1990 AS3580.5.1-1993 AS3580.4.1-1990 AS3580.9.8-2001	Medium	Trees within 20m of site (kept pruned below inlet height)	Major roads Industry (power generation)
Toowoomba							
North Toowoomba	Campaign - GRUB	July 2003	Carbon monoxide Ozone Nitrogen dioxide PM_{10} $PM_{2.5}$	AS3580.7.1-1992 AS3580.6.1-1990 AS3580.5.1-1993 AS3580.9.8-2001 TEOM, based on	High	Nil	Major roads Solid fuel heaters

Table 1: 2005 Queensland AAQ NEPM monitoring sites (continued)

Site	Station type	Established	Pollutants monitored	Monitoring techniques	Exposed population	Non-conformance with AS2922 siting criteria	Major pollutant sources
Gladstone							
South Gladstone	Trend - GRUB	July 1992	Nitrogen dioxide Sulfur dioxide PM_{10}	AS3580.5.1-1993 AS3580.4.1-1990 AS3580.9.8-2001	Medium	Trees within 20m to north-west of site	Major roads Industry (power generation, metals processing)
Targinie	Campaign - GRUB	December 2000	Ozone	Differential Optical Absorption Spectroscopy	Low	Trees within 20m of DOAS light path	Industry (cement manufacture, metals processing, petroleum refining, power
Mackay							
West Mackay	PMS - GRUB	September 1997	PM_{10}	AS3580.9.8-2001	Medium	Nil	Agricultural burning
Townsville							
Pimlico	Campaign – population average	May 2004	Ozone Nitrogen dioxide Sulfur dioxide PM_{10}	AS3580.6.1-1990 AS3580.5.1-1993 AS3580.4.1-1990 AS3580.9.8-2001	High	Nil	Major roads Industry (metals processing, port operations)
Stuart	Campaign - GRUB	September 2001	Sulfur dioxide	AS3580.4.1-1990	Low	Nil	Industry (metals processing)
Mount Isa							
Menzies	Trend - GRUB	January 1983	Sulfur dioxide	AS3580.4.1-1990	Low	Tress within 20m of site (kept pruned below inlet height)	Industry (metals smelting, sulfuric acid manufacture)

Implementation activities

In 2005 the EPA continued to monitor ambient air quality in the same six regions as in 2004. $PM_{2.5}$ monitoring using reference samplers on a one in three day basis has continued at the Rocklea and Springwood sites in south-east Queensland as required under the AAQ NEPM $PM_{2.5}$ Equivalence Program.

In October 2005 the range of pollutants monitored at the Pimlico site in Townsville was extended to include sulfur dioxide. The Pimlico site is more representative of average population exposure in Townsville than the Stuart site.

Variations to the approved monitoring plan for Queensland

Delays in establishing monitoring in other centres, commitments under the AAQ NEPM $PM_{2.5}$ Equivalency Program and other resource constraints have meant that it has not been possible to begin monitoring in Cairns, Mackay, Rockhampton and Bundaberg according to the timeframes set out in the monitoring plan for Queensland.

The need for campaign monitoring of ozone and nitrogen dioxide in Cairns, Mackay, Rockhampton and Bundaberg will be assessed based on the results of campaign monitoring in Townsville and the outcome of modelling studies commissioned by the AAQ NEPM Peer Review Committee.

The Brisbane CBD monitoring station was closed in November 2004 as the building housing the monitoring equipment was to be refurbished. With the closure of the Brisbane CBD site, measurement data from the EPA's Woolloongabba monitoring station will now be used for reporting against the AAQ NEPM carbon monoxide standard for south-east Queensland. The Woolloongabba station is located adjacent to a major inner-city traffic corridor. Measurements at this site are indicative of the highest ambient carbon monoxide concentrations residents of south-east Queensland would be exposed to. Carbon monoxide data have been collected at the Woolloongabba site since mid-1998 and trend information for this period has been included in this report.

Section B – Assessment of compliance with standards and 2008 goal

This section provides details of the annual compliance assessment for January to December 2005. Compliance criteria are applied on an individual basis at each performance monitoring station operating in the various Queensland regions during the year. South-east Queensland performance monitoring stations are further classified under the respective sub-region.

The National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 8 specifies that to make a valid assessment of compliance, a data availability rate of at least 75 percent in each calendar quarter is required. For this reason, compliance with the standards and 2008 goal could not be demonstrated for sulfur dioxide at the Pimlico and Menzies monitoring stations.

Tables 2 to 7 summarise compliance of monitoring with the standards and 2008 goal for AAQ NEPM pollutants for 2005. Performance is assessed as meeting the standards and goals if the number of exceedences of the standard is no more than the number specified in schedule 2 of the AAQ NEPM and data availability was at least 75 percent in each quarter of the year. Regions where monitoring has not been conducted can also be considered to meet the standards and goals on the basis that screening shows pollutant levels are reasonably expected to be consistently below the relevant standard (National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures" (available from *www.ephc.gov.au*)).

TEOM PM_{10} data quoted in this report have been adjusted using the temperature-dependent factor described in option 2 in the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 10, "Collection and Reporting of TEOM PM_{10} Data" (available from *www.ephc.gov.au*). The resulting adjustments vary linearly from no change at daily average temperatures at or above 15deg to an increase of 40 percent at a temperature of 5deg.

$PM_{2.5}$ data in this report has been obtained using either reference samplers (Partisol 2025 sequential air samplers) operating on a one in three day basis or TEOM $PM_{2.5}$ instrumentation operating continuously. The TEOM instrumentation has been operated in accordance with the protocol outlined in the National Environment Protection (Ambient Air Quality) Measure Technical Paper on Monitoring for Particles as $PM_{2.5}$.

Carbon monoxide

Table 2: 2005 compliance summary for carbon monoxide in Queensland

AAQ NEPM Standard
9.0 ppm (8-hour average)

Region/ Performance monitoring station	Data availability rates (% of hours)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
South-east Queensland *Brisbane sub-region* Woolloongabba	94.1	77.9	95.2	90.1	89.3	0	met
Toowoomba North Toowoomba	94.2	95.1	95.2	90.7	93.8	0	met

Regions which do not require monitoring on the basis of screening arguments that pollutant levels are reasonably expected to be consistently below the relevant NEPM standard (i.e. performance is "met").

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Maryborough/Hervey Bay
- Rockhampton
- Townsville
- Mount Isa

Motor vehicles are the major contributor to ambient carbon monoxide levels in urban areas where the use of combustion stoves and wood heaters in winter is minimal. Carbon monoxide concentrations at the Brisbane CBD performance monitoring station in south-east Queensland over the period 2000 to 2004 were consistently less than 40 percent of the AAQ NEPM standard (see section D). On this basis, carbon monoxide monitoring in coastal Queensland centres with lower traffic density and warmer winter temperatures than south-east Queensland is not required under screening procedure F in table 1 of the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures".

Carbon monoxide compliance in Mount Isa can be inferred on the basis of campaign monitoring conducted in Toowoomba, an inland Queensland centre with greater population, lower winter temperatures and higher solid fuel heater use. The maximum 8-hour average carbon monoxide concentration measured in Toowoomba from July 2003 to December 2005 was 3.4ppm, which is less than 40 percent of the AAQ NEPM standard. Using screening procedure F in table 1 of the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures", it can be concluded that carbon monoxide levels in Mount Isa will be consistently below the AAQ NEPM standard.

Nitrogen dioxide

Table 3: 2005 compliance summary for nitrogen dioxide in Queensland

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

Region/ Performance monitoring station	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
South-east Queensland									
North Coast sub-region									
Mountain Creek	94.3	94.8	94.8	94.7	94.6	0	0.005	met	met
	95.6	95.5	80.7	91.5	90.8	0	0.006	met	met
Brisbane sub-region	94.5	91.3	90.2	93.8	92.4	0	0.009	met	met
Deception Bay	99.0	99.8	99.7	97.0	98.9	0	0.006	met	met
Rocklea									
Springwood	95.4	94.7	95.1	95.0	95.0	0	0.008	met	met
Ipswich sub-region									
Flinders View	94.1	95.1	95.0	90.4	93.7	0	0.006	met	met
Toowoomba									
North Toowoomba	95.1	92.0	95.0	94.9	94.3	0	0.004	met	met
Gladstone									
South Gladstone	95.1	95.6	95.2	94.6	95.1	0	0.005	met	met
Townsville									
Pimlico									

Regions which may not require monitoring but for which screening has not yet been carried out (i.e. performance is "not demonstrated").

- Bundaberg
- Cairns
- Mackay
- Maryborough/Hervey Bay
- Mount Isa
- Rockhampton

Ozone

Table 4: 2005 compliance summary for ozone in Queensland

AAQ NEPM Standard
0.10 ppm (1-hour average)
0.08 ppm (4-hour average)

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
South-east Queensland									
North Coast sub-region									
Mountain Creek	95.1	95.0	94.9	93.1	94.5	0	0	met	met
Brisbane sub-region									
Deception Bay	95.5	89.8	92.0	95.2	93.1	0	0	met	met
Rocklea	94.3	94.1	93.7	94.0	94.0	0	0	met	met
Springwood	99.9	99.4	98.7	95.4	98.3	0	0	met	met
Ipswich sub-region									
Flinders View	95.4	94.9	94.9	95.0	95.1	0	0	met	met
Toowoomba									
North Toowoomba	94.1	95.1	95.1	90.8	93.8	0	0	met	met
Gladstone									
Targinie	98.6	95.0	99.1	82.7	93.8	0	0	met	met
Townsville									
Pimlico	95.1	95.6	95.2	94.5	95.1	0	0	met	met

Regions which may not require monitoring but for which screening has not yet been carried out (i.e. performance is "not demonstrated").

- Bundaberg
- Cairns
- Mackay
- Maryborough/Hervey Bay
- Mount Isa
- Rockhampton

Sulfur dioxide

Table 5: 2005 compliance summary for sulfur dioxide in Queensland

AAQ NEPM Standard
0.20 ppm (1-hour average)
0.08 ppm (24-hour average)
0.02 ppm (1-year average)

Region/ Performance monitoring station	Data availability rates (% of hours)					Number of exceedences (days)		Annual mean (ppm)	Performance against the standards and goal		
	Q1	Q2	Q3	Q4	Annual	1h	24h		1h	24h	1y
South-east Queensland											
Brisbane sub-region Springwood	99.9	99.4	98.8	95.6	98.4	0	0	0.001	met	met	met
Ipswich sub-region Flinders View	95.3	94.9	95.2	95.0	95.1	0	0	0.001	met	met	met
Gladstone South Gladstone	95.2	92.0	94.8	94.7	94.2	0	0	0.002	met	met	met
Townsville	0.0	0.0	0.0	69.7	17.6	0	0	0.000	ND	ND	ND
Pimlico	90.8	93.1	95.6	86.1	91.4	0	0	0.000	met	met	met
Stuart											
Mount Isa Menzies	94.9	69.6	95.6	94.2	88.6	49	2	0.009	not met	not met	ND

ND = "not demonstrated" due to insufficient data

Regions which do not require monitoring on the basis of screening arguments that pollutant levels are reasonably expected to be consistently below the relevant NEPM standard (i.e. performance is "met").

- Bundaberg
- Cairns
- Mackay
- Maryborough/Hervey Bay
- Toowoomba

Unless significant industrial point sources of sulfur dioxide exist in a region (e.g. coal-fired power stations and metals smelting), emissions of sulfur dioxide are low. Peak sulfur dioxide concentrations in the Brisbane sub-region of south-east Queensland are less than 40 percent of the AAQ NEPM standard (see section D). On this basis, sulfur dioxide monitoring in other Queensland centres with lower population and no significant sulfur dioxide point sources is not required under screening procedure F in table 1 of National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures".

Regions for which monitoring has not yet been carried out (i.e. performance is "not demonstrated").

- Rockhampton

Particles as PM_{10}

Table 6: 2005 compliance summary for PM_{10} in Queensland

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

Region/ Performance monitoring station	Data availability rates (% of days)					Number of exceedences (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
South-east Queensland							
North Coast sub-region							
Mountain Creek	96.7	91.2	97.8	97.8	95.9	2	met
Brisbane sub-region							
Rocklea	90.0	76.9	96.7	95.7	89.9	2	met
Springwood	98.9	100.0	100.0	96.7	98.9	2	met
Ipswich sub-region							
Flinders View	100.0	97.8	91.3	98.9	97.0	3	met
Toowoomba							
North Toowoomba	97.8	97.8	100.0	88.0	95.9	3	met
Gladstone							
South Gladstone	96.7	96.7	98.9	98.9	97.8	4	met
Mackay							
West Mackay	95.6	95.6	100.0	96.7	97.0	7	not met
Townsville							
Pimlico	84.4	91.2	98.9	92.4	91.8	5	met

Regions for which monitoring has not yet been carried out (i.e. performance is "not demonstrated").

- Bundaberg
- Cairns
- Maryborough/Hervey Bay
- Mount Isa
- Rockhampton

Particles as $PM_{2.5}$

Table 7: 2005 compliance summary for $PM_{2.5}$ in Queensland

AAQ NEPM Advisory Standard
25 µg/m³ (24-hour average)
8 µg/m³ (1-year average)

Region/ Performance monitoring station	Data availability rates (% of days)					Number of exceedences (days)	Annual mean (µg/m³)
	Q1	Q2	Q3	Q4	Annual		
South-east Queensland							
Brisbane sub-region							
Rocklea[a]	24.4	26.4	19.6	27.2	24.4	0	5.6
Rocklea[b]	71.1	96.7	95.7	97.8	90.4	0	4.8
Springwood[a]	26.7	25.3	23.9	26.1	25.5	0	5.1
Springwood[b]	93.3	100.0	100.0	92.4	96.4	0	4.8
Toowoomba							
North Toowoomba[b]	97.8	97.8	100.0	93.5	97.3	0	4.7

[a]Monitoring by reference method (1 in 3 days)

[b]Monitoring by TEOM instrumentation in accordance with Technical Paper on Monitoring for Particles as $PM_{2.5}$

Regions for which monitoring has not yet been carried out (i.e. performance is "not demonstrated").

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Maryborough/Hervey Bay
- Mount Isa
- Rockhampton
- Townsville

Lead

No lead monitoring was conducted in Queensland in 2005. In the absence of non-vehicle sources of lead (e.g. metals smelting), no significant sources of lead now exist in most Queensland regions following the phase-out of leaded motor vehicle fuel from March 2001. Annual lead concentrations measured at the south-east Queensland performance monitoring station (Woolloongabba) were less than 10 percent of the AAQ NEPM standard for both 2001 (0.03 µg/m^3) and 2002 (0.02 µg/m^3). As outlined in the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 9, "Lead Monitoring" (available from *www.ephc.gov.au*), these measurements demonstrate that compliance with the AAQ NEPM standard and 2008 goal has been achieved in south-east Queensland, and monitoring of lead ceased from the end of 2002.

Regions which do not require monitoring on the basis of screening arguments that pollutant levels are reasonably expected to be consistently below the relevant NEPM standard (i.e performance is "met").

- Bundaberg
- Cairns
- Gladstone
- Mackay
- Maryborough/Hervey Bay
- Rockhampton
- South-east Queensland
- Toowoomba
- Townsville

Peak lead concentrations in south-east Queensland have been less than 40 percent of the AAQ NEPM standard since 1999 (see section D, table 46). On this basis, lead monitoring in other Queensland centres with lower population and traffic density (with the exception of Mount Isa where additional lead emission sources exist) is not required under screening procedure F in table 1 of the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures".

Regions for which monitoring has not yet been carried out (i.e. performance is "not demonstrated").

- Mount Isa

Section C – Assessment of monitoring data against the standards

Information provided in this section allows qualitative and quantitative assessment and comparison of monitoring data against the standards for 2005. Statistics provided include the listing of exceedences and circumstances which led to these exceedences, and annual maxima, the second highest (for carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide) and sixth highest (for PM_{10}) daily concentrations, together with the date and site of each occurrence. Exceedence details are provided in tables 8 to 11. Summary maxima statistics are provided in tables 12 to 19.

Details of $PM_{2.5}$ measurements obtained using both reference samplers and TEOM instrumentation are also provided. The TEOM instruments were operated in accordance with the method outlined in the AAQ NEPM Technical Paper on Monitoring for Particles as $PM_{2.5}$. However TEOM $PM_{2.5}$ data cannot be used for comparison with the AAQ NEPM advisory reporting standards until the outcomes of the $PM_{2.5}$ equivalence program have been formally included in the principal measure.

Exceedence summary

During 2005, exceedences of AAQ NEPM standards occurred for sulfur dioxide and PM_{10}. There were no exceedences of the AAQ NEPM standards for ozone, carbon monoxide and nitrogen dioxide. Lead monitoring was not conducted in 2005, as compliance with the standard and 2008 goal was demonstrated in 2002 for all regions with the exception of Mount Isa where monitoring is yet to commence. TEOM 24-hour $PM_{2.5}$ concentrations did not exceed the AAQ NEPM advisory reporting standard during 2005.

Additional information on the circumstances which led to exceedences of standards during 2005 are provided in an appendix.

Table 8: 2005 sulfur dioxide exceedences in Queensland

AAQ NEPM standard
0.20 ppm (1-hour average)
0.08 ppm (24-hour average)
0.02 ppm (1-year average)

Region/ Performance monitoring station	Standard	Concentration (ppm)	Date	Time	Circumstances
Mount Isa					
Menzies	1-hour	0.964	Sep04	15	Industry emissions
		0.679	Sep26	12	Industry emissions
		0.663	Oct16	16	Industry emissions
		0.638	Oct11	22	Industry emissions
		0.614	Mar24	17	Industry emissions
		0.538	Feb01	15	Industry emissions
		0.512	Oct26	17	Industry emissions
		0.510	Dec09	08	Industry emissions
		0.452	Dec02	16	Industry emissions
		0.437	Feb21	16	Industry emissions
		0.435	Feb19	16	Industry emissions
		0.419	Jan21	08	Industry emissions
		0.410	Oct23	17	Industry emissions
		0.403	Nov19	14	Industry emissions
		0.400	Mar22	16	Industry emissions
		0.396	Jan28	16	Industry emissions
		0.395	Oct03	15	Industry emissions
		0.378	Dec13	12	Industry emissions
		0.370	Nov29	13	Industry emissions
		0.357	Aug15	12	Industry emissions
		0.344	Nov30	16	Industry emissions
		0.343	Aug10	17	Industry emissions
		0.340	Jul31	16	Industry emissions
		0.336	Jan31	13	Industry emissions
		0.335	Jul14	16	Industry emissions
		0.326	Sep14	16	Industry emissions
		0.320	Feb26	10	Industry emissions
		0.317	Jan16	18	Industry emissions
		0.315	Nov08	14	Industry emissions
		0.297	Oct22	15	Industry emissions
		0.296	Dec03	18	Industry emissions
		0.292	Nov14	14	Industry emissions
		0.277	Dec17	15	Industry emissions
		0.271	Feb10	09	Industry emissions
		0.266	Dec04	20	Industry emissions
		0.262	Sep07	15	Industry emissions
		0.258	Oct25	17	Industry emissions
		0.247	Jan27	12	Industry emissions
		0.247	Oct15	15	Industry emissions
		0.245	Sep06	17	Industry emissions
		0.243	May16	15	Industry emissions
		0.230	Feb11	19	Industry emissions
		0.227	Mar05	17	Industry emissions
		0.223	Nov15	16	Industry emissions
		0.221	Oct08	11	Industry emissions
		0.214	Nov07	06	Industry emissions
		0.214	Dec10	09	Industry emissions
		0.205	May15	15	Industry emissions
		0.203	Oct21	11	Industry emissions

	24-hour	0.091 0.085	Sep04 Dec09	24 24	Industry emissions Industry emissions

Table 9: 2005 PM_{10} exceedences in Queensland

AAQ NEPM standard
50 µg/m³ (24-hour average)

Region/ Performance monitoring station	Concentration (µg/m³)	Date	Time	Circumstances
South-east Queensland				
Mountain Creek	62.9	Feb03	24	Dust storm
	58.6	Feb04	24	Dust storm
South-east Queensland				
Rocklea	52.6	Feb03	24	Dust storm
	51.0	Feb04	24	Dust storm
South-east Queensland				
Springwood	63.6	Feb03	24	Dust storm
	54.9	Feb04	24	Dust storm
South-east Queensland				
Flinders View	64.3	Oct23	24	Dust storm
	62.9	Oct24	24	Dust storm
	51.5	Oct07	24	Bushfire smoke
Toowoomba				
North Toowoomba	111.7	Feb02	24	Dust storm
	71.3	Feb04	24	Dust storm
	51.4	Feb03	24	Dust storm
Gladstone				
South Gladstone	196.7	Feb03	24	Dust storm
	87.4	Feb04	24	Dust storm
	74.0	Feb06	24	Dust storm
	53.8	Feb05	24	Dust storm
Mackay				
West Mackay	146.0	Feb04	24	Dust storm
	120.5	Feb05	24	Dust storm
	111.6	Feb06	24	Dust storm
	105.1	Feb03	24	Dust storm
	62.9	Feb07	24	Dust storm
	54.2	Dec19	24	Bushfire smoke
	52.6	Jul13	24	Smoke from agricultural burning and dust from nearby commercial activities
Townsville				
Pimlico	141.9	Feb03	24	Dust storm
	115.5	Feb05	24	Dust storm
	113.0	Feb04	24	Dust storm
	102.1	Feb06	24	Dust storm
	83.5	Feb07	24	Dust storm

2005 maximum, second-highest and sixth-highest concentration summaries

Table 10: 2005 summary statistics for daily peak 8-hour CO in Queensland

AAQ NEPM standard
9.0 ppm (8-hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:time)
South-east Queensland					
Woolloongabba	347	4.0	May25:01	3.5	Jul08:01 Aug04:01
Toowoomba					
North Toowoomba	363	2.3	Jul15:03	1.9	Jul01:03

Table 11: 2005 summary statistics for daily peak 1-hour nitrogen dioxide in Queensland

AAQ NEPM standard
0.12 ppm (1-hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:time)
South-east Queensland	365	0.032	Aug10:19	0.031	May23:19
Mountain Creek	348	0.034	Jul30:20	0.033	May25:18 Jul26:18 May22:19
Deception Bay	360	0.046	Sep13:21	0.044	May27:19 Aug09:20 Jul29:20
Rocklea	364	0.041	Sep14:19	0.040	Aug08:19 Aug10:19
Springwood	365	0.055	Oct06:21	0.048	Jul29:19
Flinders View					
Toowoomba	362	0.057	Oct03:19	0.040	Sep19:19
North Toowoomba					
Gladstone	364	0.035	Aug17:16	0.033	Aug11:12
South Gladstone					
Townsville	365	0.034	May19:19	0.033	May27:20
Pimlico					Jul27:20

Table 12: 2005 summary statistics for daily peak 1-hour ozone in Queensland

AAQ NEPM standard
0.10 ppm (1-hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:time)
South-east Queensland	364	0.051	Oct07:11	0.050	Oct03:13
Mountain Creek	359	0.079	Dec14:13	0.076	Oct07:11
Deception Bay	365	0.081	Oct07:13	0.077	Dec29:16
Rocklea	364	0.050	Dec10:16	0.045	Oct07:11
Springwood	365	0.085	Oct08:13		Dec05:14
Flinders View			Dec23:15		
Toowoomba	362	0.064	Oct04:18	0.062	Feb08:15
North Toowoomba					
Gladstone	350	0.038	Sep20:10	0.034	Oct09:17
Targinie					Oct10:15
Townsville	365	0.054	Dec18:16	0.049	Feb05:13
Pimlico					

Table 13: 2005 summary statistics for daily peak 4-hour ozone in Queensland

AAQ NEPM standard
0.08 ppm (4-hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:time)
South-east Queensland	365	0.049	Oct07:17	0.047	Oct03:16
Mountain Creek	360	0.063	Oct07:14	0.062	Dec10:14
Deception Bay	365	0.067	Dec29:16	0.065	Feb04:15
Rocklea	364	0.040	Dec05:14 Dec29:15		Oct07:15
Springwood	365	0.067	Feb07:17	0.066	Feb04:17
Flinders View					Oct08:14 Dec23:16
Toowoomba	363	0.057	Feb08:17	0.056	Feb17:16
North Toowoomba					
Gladstone	350	0.031	Oct09:18 Oct10:16		
Targinie					
Townsville	365	0.049	Dec18:17	0.045	Feb05:14
Pimlico					

Table 14: 2005 summary statistics for daily peak 1-hour sulfur dioxide in Queensland

AAQ NEPM standard
0.20 ppm (1-hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:time)
South-east Queensland	364	0.015	Aug08:11	0.010	Aug15:10
Springwood	365	0.034	Apr26:12		
Flinders View			Oct12:19		
Gladstone	364	0.084	Apr06:15	0.066	Aug11:12
South Gladstone					
Townsville	68	0.003	Nov03:07	0.002	6 days in total
Pimlico	355	0.024	Jan15:22	0.015	Jan19:05
Stuart					
Mount Isa	342	0.964	Sep04:15	0.679	Sep26:12
Menzies					

Table 15: 2005 summary statistics for 24-hour sulfur dioxide in Queensland

AAQ NEPM standard
0.08 ppm (24-hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date)	2nd highest (ppm)	2nd highest (date)
South-east Queensland	360	0.003	Sep15	0.002	47 days in total
Springwood	365	0.006	Jan24		
Flinders View			Nov08		
Gladstone	361	0.011	Dec31	0.010	
South Gladstone					Aug17
Townsville	66	0.001	Dec02		
Pimlico			Dec10		
			Dec16		
	344	0.013	Jan15	0.004	
Stuart					Jan05
Mount Isa	335	0.091	Sep04	0.085	
Menzies					Dec09

Table 16: 2005 summary statistics for 24-hour PM_{10} in Queensland

AAQ NEPM standard
50 µg/m³ (24-hour average)

Region/ Performance monitoring station	Number of valid days	Highest (µg/m³)	Highest (date)	6th highest (µg/m³)	6th highest (date)
South-east Queensland	350	62.9	Feb03	30.1	Nov16
Mountain Creek	328	52.6	Feb03	37.8	Feb05
Rocklea	361	63.6	Feb03	35.6	Oct06
Springwood	354	64.3	Feb03	41.1	Feb06
Flinders View					
Toowoomba	350	111.7	Feb02	35.3	Feb08
North Toowoomba					
Gladstone	357	196.7	Feb03	40.1	Feb07
South Gladstone					
Mackay	354	146.0	Feb04	54.2	Dec19
West Mackay					
Townsville	335	141.9	Feb03	34.4	Oct21
Pimlico					

Table 17: 2005 summary statistics for 24-hour $PM_{2.5}$ in Queensland

AAQ NEPM advisory reporting standard
25 µg/m³ (24-hour average)
8 µg/m³ (1-year average)

Region/ Performance monitoring station	Number of valid days	Highest (µg/m³)	Highest (date)

South-east Queensland			
Rocklea[a]	89	13.8	Oct10
Rocklea[b]	330	15.3	Oct05
Springwood[a]	93	14.1	Oct07
Springwood[b]	352	15.2	Oct07
Toowoomba			
North Toowoomba[b]	355	24.8	Feb02

[a]Monitoring by reference method (1 in 3 days)

[b]Monitoring by TEOM instrumentation in accordance with Technical Paper on Monitoring for Particles as $PM_{2.5}$

Section D – Data analysis

This section provides pollutant distribution information for 2005 (tables 20 to 27), and multi-year data for nominated trend stations in the Queensland air monitoring plan (tables 28 to 51).

2005 pollutant distribution information

Table 18: Percentiles of daily peak 8-hour carbon monoxide concentrations for 2005

AAQ NEPM standard
9.0 ppm (8-hour average)

	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
South-east Queensland								
Woolloongabba	95.1	4.0	3.5	3.3	2.6	2.1	1.4	1.0
Toowoomba								
North Toowoomba	99.5	2.3	1.8	1.7	1.1	0.7	0.2	0.1

Table 19: Percentiles of daily peak 1-hour nitrogen dioxide concentrations for 2005

AAQ NEPM standard
0.12 ppm (1-hour average)

	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
South-east Queensland								
Mountain Creek	100.0	0.032	0.031	0.028	0.025	0.022	0.016	0.010
Deception Bay	95.3	0.034	0.033	0.030	0.028	0.026	0.021	0.014
Rocklea	98.6	0.046	0.042	0.041	0.036	0.031	0.024	0.017
Springwood	99.7	0.041	0.034	0.032	0.029	0.027	0.023	0.017
Flinders View	100.0	0.055	0.046	0.038	0.032	0.028	0.023	0.017
Toowoomba								
North Toowoomba	99.2	0.057	0.038	0.036	0.033	0.030	0.023	0.013
Gladstone								
South Gladstone	99.7	0.035	0.030	0.028	0.024	0.022	0.017	0.012
Townsville								
Pimlico	100.0	0.034	0.032	0.031	0.028	0.024	0.019	0.011

Table 20: Percentiles of daily peak 1-hour ozone concentrations for 2005

AAQ NEPM standard
0.10 ppm (1-hour average)

	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
South-east Queensland								
Mountain Creek	99.7	0.051	0.047	0.045	0.040	0.037	0.033	0.028
Deception Bay	98.4	0.079	0.065	0.056	0.050	0.044	0.038	0.033
Rocklea	100.0	0.081	0.074	0.070	0.061	0.053	0.042	0.034
Springwood	99.7	0.050	0.044	0.044	0.036	0.032	0.026	0.022
Flinders View	100.0	0.085	0.075	0.073	0.063	0.056	0.045	0.035
Toowoomba								
North Toowoomba	99.2	0.064	0.061	0.055	0.051	0.045	0.039	0.032
Gladstone								
Targinie	95.9	0.038	0.033	0.032	0.028	0.027	0.025	0.020
Townsville								
Pimlico	100.0	0.054	0.043	0.043	0.040	0.035	0.032	0.026

Table 21: Percentiles of daily peak 4-hour ozone concentrations for 2005

AAQ NEPM standard
0.08 ppm (4-hour average)

	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
South-east Queensland								
Mountain Creek	100.0	0.049	0.044	0.042	0.038	0.035	0.031	0.026
Deception Bay	98.6	0.063	0.061	0.049	0.046	0.041	0.036	0.031
Rocklea	100.0	0.067	0.064	0.059	0.052	0.047	0.039	0.031
Springwood	99.7	0.040	0.038	0.036	0.032	0.029	0.025	0.021
Flinders View	100.0	0.067	0.066	0.062	0.057	0.050	0.040	0.032
Toowoomba								
North Toowoomba	99.5	0.057	0.053	0.052	0.047	0.042	0.036	0.031
Gladstone								
Targinie	95.9	0.031	0.030	0.027	0.026	0.024	0.022	0.017
Townsville								
Pimlico	100.0	0.049	0.041	0.040	0.038	0.034	0.031	0.025

Table 22: Percentiles of daily peak 1-hour sulfur dioxide concentrations for 2005

AAQ NEPM standard
0.20 ppm (1-hour average)

	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
South-east Queensland								
Springwood	99.7	0.015	0.007	0.007	0.005	0.005	0.003	0.001
Flinders View	100.0	0.034	0.028	0.024	0.020	0.014	0.008	0.003
Gladstone								
South Gladstone	99.7	0.084	0.063	0.053	0.032	0.027	0.013	0.007
Townsville								
Pimlico	18.6	0.003	0.003	0.003	0.002	0.002	0.001	0.000
Stuart	97.3	0.024	0.007	0.005	0.003	0.002	0.001	0.001
Mount Isa								
Menzies	93.7	0.964	0.663	0.512	0.395	0.271	0.090	0.003

Table 23: Percentiles of daily 24-hour sulfur dioxide concentrations for 2005

AAQ NEPM standard
0.08 ppm (24-hour average)

	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
South-east Queensland								
Springwood	98.6	0.002	0.002	0.002	0.002	0.002	0.001	0.001
Flinders View	100.0	0.004	0.004	0.004	0.002	0.002	0.001	0.001
Gladstone								
South Gladstone	98.9	0.011	0.009	0.006	0.004	0.004	0.002	0.001
Townsville								
Pimlico	18.1	0.001	0.001	0.001	0.001	0.000	0.000	0.000
Stuart	94.2	0.013	0.003	0.002	0.001	0.001	0.000	0.000
Mount Isa								
Menzies	91.8	0.091	0.069	0.060	0.044	0.032	0.010	0.001

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

AAQ NEPM standard
50 µg/m³ (24-hour average)

	Data availability rates (%)	Max conc. (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)	75th percentile (µg/m³)	50th percentile (µg/m³)
South-east Queensland								
Mountain Creek	95.9	62.9	37.6	29.7	24.4	20.3	17.1	13.5
Rocklea	89.9	52.6	46.1	37.3	27.8	23.8	19.8	15.9
Springwood	98.9	63.6	40.7	35.4	25.9	22.2	17.5	14.3
Flinders View	97.0	64.3	44.7	40.7	26.8	24.0	19.3	14.8
Toowoomba								
North Toowoomba	95.9	111.7	43.1	34.6	28.5	24.6	18.3	14.3
Gladstone								
South Gladstone	97.8	196.7	53.8	37.1	26.6	26.6	18.9	15.3
Mackay								
West Mackay	97.0	146.0	105.1	52.6	36.3	31.1	25.0	19.8
Townsville								
Pimlico	91.8	141.9	113.0	31.7	23.4	20.5	17.7	14.5

Table 25: Percentiles of daily 24-hour $PM_{2.5}$ concentrations for 2005

AAQ NEPM advisory reporting standards
25 µg/m³ (24-hour average)
8 µg/m³ (1-year average)

	Data availability rates (%)	Max conc. (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)	75th percentile (µg/m³)	50th percentile (µg/m³)
South-east Queensland								
Rocklea[a]	24.4	13.8	13.8	11.3	10.3	8.8	6.9	5.4
Rocklea[b]	90.4	15.3	13.1	11.1	9.5	8.1	5.9	4.3
Springwood[a]	25.5	14.1	14.1	12.7	9.5	8.1	6.4	4.5
Springwood[b]	96.4	15.2	13.9	12.3	10.2	8.5	5.9	4.1
Toowoomba								
North Toowoomba[b]	97.3	24.8	14.7	13.6	10.9	8.6	6.2	4.1

[a]Monitoring by reference method (1 in 3 days)

[b]Monitoring by TEOM instrumentation in accordance with Technical Paper on Monitoring for Particles as $PM_{2.5}$

Multi-year statistics for trend stations

Table 26: Daily peak 8-hour carbon monoxide summary 1998 to 2004

Trend station/region: Brisbane CBD, south-east Queensland

AAQ NEPM standard 9.0 ppm (8-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1998	*73.7**	*0*	*3.4*	*3.3*	*2.7*	*2.6*	*2.3*
1999	80.0*	0	5.8	3.6	3.5	2.9	2.7
2000	78.1*	0	2.7	2.6	2.4	2.2	1.8
2001	95.9	0	3.3	2.4	2.2	1.9	1.6
2002	*72.9**	*0*	*2.5*	*2.3*	*2.1*	*1.6*	*1.5*
2003	97.0	0	2.7	2.2	1.9	1.5	1.2
2004	81.7*	0	3.3	3.1	2.3	1.7	1.2

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 27: Daily peak 8-hour carbon monoxide summary 1998 to 2005

Trend station/region: Woolloongabba, south-east Queensland

AAQ NEPM standard 9.0 ppm (8-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1998	*57.0**	*0*	*5.1*	*5.0*	*4.4*	*4.1*	*3.4*
1999	92.3*	0	5.7	5.3	4.9	4.0	3.2
2000	92.9	0	5.0	4.7	4.2	3.4	2.9
2001	97.0	0	7.0	4.4	4.3	3.9	3.2
2002	97.0	0	4.7	4.7	4.1	3.6	3.0
2003	83.3*	0	5.4	4.4	4.2	3.5	2.7
2004	98.9	0	4.7	4.2	3.8	3.3	2.6
2005	95.1	0	4.0	3.5	3.3	2.6	2.1

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 28: Daily peak 1-hour nitrogen dioxide summary 1995 to 2005

Trend station/region: Deception Bay, south-east Queensland

AAQ NEPM standard 0.12 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1995	93.4	0	0.058	0.054	0.046	0.038	0.033
1996	*68.6**	*0*	*0.048*	*0.043*	*0.042*	*0.034*	*0.030*
1997	95.6	0	0.043	0.038	0.036	0.032	0.028
1998	97.5	0	0.066	0.050	0.039	0.031	0.026
1999	96.4	0	0.058	0.039	0.030	0.028	0.024
2000	99.5	0	0.053	0.038	0.034	0.029	0.025
2001	95.1	0	0.047	0.040	0.039	0.034	0.030
2002	87.4*	0	0.065	0.044	0.042	0.036	0.030

2003	94.5	0	0.053	0.036	0.033	0.030	0.028
2004	97.8	0	0.045	0.036	0.036	0.030	0.027
2005	95.3	0	0.034	0.033	0.030	0.028	0.026

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 29: Daily peak 1-hour nitrogen dioxide summary 1980 to 2005

Trend station/region: Rocklea, south-east Queensland

AAQ NEPM standard 0.12 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1980	97.3	0	0.070	0.065	0.058	0.043	0.038
1981	78.9*	0	0.070	0.060	0.051	0.041	0.037
1982	97.8	0	0.073	0.058	0.054	0.048	0.040
1983	95.6	0	0.056	0.050	0.042	0.033	0.030
1984	83.3*	0	0.076	0.061	0.056	0.048	0.041
1985	91.2	0	0.048	0.044	0.039	0.035	0.031
1986	83.6*	2	0.160	0.099	0.069	0.056	0.045
1987	92.1	0	0.089	0.078	0.067	0.060	0.052
1988	*60.1**	*0*	*0.114*	*0.083*	*0.077*	*0.066*	*0.055*
1989	84.4*	0	0.073	0.069	0.061	0.054	0.047
1990	75.3*	0	0.079	0.070	0.064	0.053	0.046
1991	89.0	0	0.113	0.085	0.071	0.061	0.052
1992	77.9*	2	0.157	0.072	0.065	0.052	0.042
1993	89.6	0	0.086	0.066	0.058	0.047	0.040
1994	91.8	0	0.096	0.062	0.057	0.051	0.045
1995	79.5*	0	0.066	0.050	0.048	0.040	0.036
1996	90.4*	0	0.058	0.055	0.044	0.040	0.036
1997	95.6	0	0.061	0.043	0.042	0.039	0.033
1998	96.2	0	0.056	0.046	0.041	0.038	0.033
1999	91.2*	0	0.054	0.044	0.042	0.034	0.029
2000	96.7	0	0.059	0.046	0.043	0.037	0.032
2001	98.4	0	0.049	0.042	0.041	0.035	0.032
2002	98.4	0	0.051	0.046	0.041	0.037	0.033
2003	97.0	0	0.050	0.039	0.038	0.033	0.030
2004	95.6	0	0.049	0.047	0.043	0.037	0.033
2005	98.6	0	0.046	0.042	0.041	0.036	0.031

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 30: Daily peak 1-hour nitrogen dioxide summary 1995 to 2005

Trend station/region: Flinders View, south-east Queensland

AAQ NEPM standard 0.12 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1995	91.2*	0	0.038	0.037	0.035	0.031	0.028
1996	98.4	0	0.055	0.050	0.044	0.037	0.033
1997	96.4	0	0.046	0.042	0.040	0.036	0.030
1998	96.4	0	0.048	0.041	0.039	0.034	0.030
1999	98.4	0	0.046	0.039	0.038	0.032	0.029
2000	99.2	0	0.042	0.040	0.038	0.034	0.031
2001	100.0	0	0.045	0.037	0.036	0.034	0.031

2002	88.8*	0	0.062	0.057	0.043	0.036	0.033
2003	94.0	0	0.046	0.039	0.037	0.033	0.029
2004	100.0	0	0.054	0.047	0.038	0.034	0.030
2005	100.0	0	0.055	0.046	0.038	0.032	0.028

*Data availability less than 75 percent for one or more quarters.

Table 31: Daily peak 1-hour nitrogen dioxide summary 1994 to 2005

Trend station/region: South Gladstone, Gladstone

AAQ NEPM standard 0.12 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1994	81.6*	0	0.049	0.047	0.044	0.038	0.028
1995	91.8	0	0.038	0.030	0.028	0.025	0.022
1996	84.2*	0	0.045	0.039	0.035	0.032	0.029
1997	*65.8**	*0*	*0.031*	*0.030*	*0.029*	*0.022*	*0.017*
1998	*72.9**	*0*	*0.022*	*0.020*	*0.018*	*0.015*	*0.012*
1999	88.8*	0	0.034	0.029	0.029	0.025	0.021
2000	97.8	0	0.031	0.025	0.024	0.022	0.019
2001	96.4	0	0.048	0.033	0.031	0.026	0.023
2002	98.4	0	0.036	0.031	0.029	0.026	0.021
2003	95.3	0	0.035	0.030	0.027	0.024	0.022
2004	100.0	0	0.042	0.030	0.029	0.026	0.023
2005	99.7	0	0.035	0.030	0.028	0.024	0.022

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 32: Daily peak 1-hour ozone summary 1995 to 2005

Trend station/region: Deception Bay, south-east Queensland

AAQ NEPM standard 0.10 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1995	95.9	0	0.083	0.075	0.070	0.052	0.047
1996	95.9	0	0.091	0.073	0.064	0.055	0.048
1997	100.0	0	0.079	0.065	0.057	0.048	0.043
1998	94.2	0	0.069	0.060	0.053	0.048	0.044
1999	99.2	0	0.092	0.062	0.057	0.048	0.043
2000	99.7	0	0.070	0.058	0.054	0.046	0.041
2001	86.6*	0	0.079	0.058	0.054	0.048	0.044
2002	89.6*	0	0.071	0.063	0.061	0.048	0.044
2003	97.0	0	0.095	0.063	0.057	0.047	0.043
2004	96.7	0	0.070	0.058	0.055	0.048	0.045
2005	98.4	0	0.079	0.065	0.056	0.050	0.044

*Data availability less than 75 percent for one or more quarters.

Table 33: Daily peak 1-hour ozone summary 1980 to 2005

Trend station/region: Rocklea, south-east Queensland

AAQ NEPM standard 0.10 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1980	97.5	0	0.083	0.078	0.066	0.058	0.050
1981	90.7	0	0.078	0.073	0.062	0.049	0.042
1982	97.8	1	0.102	0.070	0.065	0.057	0.047
1983	97.5	0	0.099	0.071	0.068	0.059	0.041
1984	95.1	1	0.102	0.070	0.064	0.055	0.046
1985	91.0	1	0.105	0.079	0.056	0.047	0.036
1986	84.1*	0	0.074	0.073	0.063	0.057	0.050
1987	*72.1**	*4*	*0.125*	*0.106*	*0.100*	*0.078*	*0.055*
1988	*67.5**	*1*	*0.101*	*0.085*	*0.069*	*0.047*	*0.039*
1989	82.5*	0	0.071	0.058	0.051	0.042	0.036
1990	76.2*	0	0.061	0.051	0.042	0.036	0.031
1991	91.2	0	0.061	0.053	0.045	0.039	0.031
1992	94.0	0	0.069	0.059	0.049	0.039	0.035
1993	94.8	0	0.096	0.063	0.059	0.054	0.050
1994	95.1	1	0.127	0.083	0.073	0.059	0.050
1995	78.6*	0	0.098	0.086	0.070	0.061	0.053
1996	97.0	2	0.135	0.090	0.085	0.071	0.060
1997	97.0	0	0.093	0.085	0.077	0.065	0.053
1998	95.1	1	0.103	0.080	0.078	0.064	0.053
1999	94.2	1	0.135	0.093	0.066	0.057	0.047
2000	96.2	0	0.088	0.076	0.066	0.057	0.049
2001	99.2	0	0.093	0.072	0.063	0.055	0.047
2002	98.6	2	0.118	0.075	0.073	0.060	0.054
2003	97.8	0	0.065	0.063	0.059	0.052	0.046
2004	95.9	0	0.088	0.080	0.076	0.064	0.055
2005	100.0	0	0.081	0.074	0.070	0.061	0.053

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 34: Daily peak 1-hour ozone summary 1994 to 2005

Trend station/region: Flinders View, south-east Queensland

AAQ NEPM standard 0.10 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1994	97.5	0	0.076	0.069	0.062	0.056	0.048
1995	95.1	0	0.079	0.071	0.065	0.056	0.051
1996	98.6	2	0.125	0.082	0.075	0.063	0.055
1997	97.5	2	0.106	0.094	0.078	0.066	0.056
1998	95.1	0	0.100	0.085	0.076	0.066	0.056
1999	98.6	1	0.127	0.082	0.077	0.055	0.048
2000	99.2	1	0.116	0.073	0.070	0.060	0.054

2001	99.5	0	0.079	0.074	0.070	0.059	0.051
2002	95.3	0	0.098	0.080	0.078	0.070	0.062
2003	96.7	0	0.087	0.073	0.068	0.056	0.048
2004	100.0	2	0.114	0.079	0.077	0.066	0.058
2005	100.0	0	0.085	0.075	0.073	0.063	0.056

Table 35: Daily peak 4-hour ozone summary 1995 to 2005

Trend station/region: Deception Bay, south-east Queensland

AAQ NEPM standard 0.08 ppm (4-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1995	95.9	0	0.077	0.061	0.057	0.047	0.043
1996	95.9	0	0.076	0.065	0.059	0.049	0.045
1997	100.0	0	0.066	0.053	0.050	0.044	0.040
1998	94.2	0	0.059	0.054	0.049	0.043	0.040
1999	99.2	1	0.083	0.055	0.052	0.043	0.039
2000	99.7	0	0.063	0.050	0.049	0.042	0.038
2001	86.6*	0	0.075	0.056	0.050	0.044	0.040
2002	89.6*	0	0.067	0.060	0.053	0.044	0.041
2003	97.0	0	0.076	0.060	0.052	0.044	0.040
2004	96.7	0	0.062	0.053	0.049	0.044	0.042
2005	98.6	0	0.063	0.061	0.049	0.046	0.041

*Data availability less than 75 percent for one or more quarters.

Table 36: Daily peak 4-hour ozone summary 1994 to 2005

Trend station/region: Flinders View, south-east Queensland

AAQ NEPM standard 0.08 ppm (4-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1994	97.5	0	0.072	0.058	0.056	0.047	0.043
1995	95.1	0	0.066	0.062	0.060	0.050	0.044
1996	98.6	2	0.091	0.068	0.065	0.058	0.049
1997	97.5	2	0.090	0.073	0.067	0.056	0.049
1998	95.1	0	0.069	0.065	0.064	0.057	0.049
1999	98.6	1	0.101	0.067	0.064	0.049	0.043
2000	99.2	1	0.089	0.064	0.061	0.052	0.048
2001	99.5	0	0.072	0.066	0.058	0.052	0.047
2002	95.3	1	0.083	0.070	0.066	0.061	0.055
2003	96.7	0	0.080	0.067	0.059	0.049	0.044
2004	100.0	1	0.100	0.071	0.067	0.057	0.050
2005	100.0	0	0.067	0.066	0.062	0.057	0.050

Table 37: Daily peak 4-hour ozone summary 1980 to 2005

Trend station/region: Rocklea, south-east Queensland

AAQ NEPM standard 0.08 ppm (4-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1980	97.5	0	0.076	0.063	0.059	0.049	0.043
1981	90.7	0	0.069	0.056	0.051	0.043	0.038
1982	97.8	0	0.076	0.058	0.053	0.048	0.040
1983	97.5	0	0.078	0.058	0.054	0.047	0.036
1984	95.1	0	0.080	0.059	0.054	0.047	0.041
1985	91.0	1	0.090	0.069	0.051	0.039	0.031
1986	84.1*	0	0.063	0.059	0.052	0.049	0.041
1987	*72.1**	*8*	*0.110*	*0.094*	*0.093*	*0.066*	*0.049*
1988	*67.5**	*1*	*0.081*	*0.065*	*0.050*	*0.041*	*0.035*
1989	82.5*	0	0.060	0.048	0.042	0.037	0.032
1990	76.2*	0	0.053	0.042	0.037	0.030	0.028
1991	91.2	0	0.054	0.043	0.039	0.032	0.026
1992	94.0	0	0.058	0.052	0.042	0.034	0.031
1993	94.8	0	0.074	0.054	0.053	0.048	0.043
1994	95.1	1	0.101	0.075	0.063	0.051	0.043
1995	78.6*	0	0.080	0.070	0.058	0.054	0.047
1996	97.0	1	0.111	0.076	0.070	0.061	0.051
1997	97.0	0	0.080	0.069	0.064	0.056	0.045
1998	95.1	1	0.091	0.068	0.064	0.057	0.049
1999	94.2	1	0.102	0.066	0.058	0.049	0.042
2000	96.2	0	0.072	0.063	0.054	0.049	0.044
2001	99.2	0	0.071	0.063	0.056	0.048	0.043
2002	98.6	1	0.105	0.068	0.061	0.054	0.047
2003	97.8	0	0.059	0.053	0.051	0.047	0.042
2004	95.9	0	0.077	0.069	0.064	0.057	0.050
2005	100.0	0	0.067	0.064	0.059	0.052	0.047

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 38: Daily peak 1-hour sulfur dioxide summary 1993 to 2005

Trend station/region: Flinders View, south-east Queensland

AAQ NEPM standard 0.20 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1993	88.2*	0	0.049	0.030	0.024	0.018	0.014
1994	98.9	0	0.033	0.027	0.025	0.021	0.017
1995	*59.5**	*0*	*0.041*	*0.029*	*0.027*	*0.020*	*0.014*
1996	88.3*	0	0.047	0.037	0.027	0.023	0.017
1997	97.0	0	0.047	0.040	0.035	0.023	0.019
1998	95.9	0	0.090	0.037	0.033	0.024	0.019
1999	96.4	0	0.070	0.035	0.033	0.028	0.021

2000	89.9	0	0.081	0.049	0.036	0.027	0.022
2001	99.5	0	0.053	0.048	0.043	0.029	0.023
2002	97.0	0	0.057	0.035	0.033	0.025	0.018
2003	96.4	0	0.046	0.031	0.030	0.023	0.017
2004	99.5	0	0.063	0.036	0.031	0.021	0.016
2005	100.0	0	0.034	0.028	0.024	0.020	0.014

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 39: Daily peak 1-hour sulfur dioxide summary 1991 to 2005

Trend station/region: South Gladstone, Gladstone

AAQ NEPM standard 0.20 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1991	92.6	0	0.011	0.011	0.009	0.008	0.006
1992	94.3	0	0.052	0.039	0.029	0.020	0.015
1993	98.3	0	0.075	0.059	0.050	0.039	0.032
1994	97.0	0	0.070	0.042	0.040	0.031	0.024
1995	96.7	0	0.168	0.083	0.065	0.047	0.035
1996	99.2	0	0.083	0.053	0.042	0.026	0.018
1997	98.9	0	0.049	0.029	0.023	0.014	0.010
1998	97.5	0	0.076	0.050	0.042	0.027	0.020
1999	94.2	0	0.051	0.042	0.039	0.027	0.022
2000	84.7*	0	0.092	0.071	0.045	0.034	0.024
2001	98.1	0	0.068	0.046	0.035	0.023	0.018
2002	94.5	0	0.123	0.040	0.031	0.025	0.020
2003	93.2	0	0.112	0.058	0.041	0.025	0.019
2004	96.4	0	0.064	0.040	0.032	0.022	0.017
2005	99.7	0	0.084	0.063	0.053	0.032	0.027

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 40: Daily peak 1-hour sulfur dioxide summary 1983 to 2005

Trend station/region: Menzies, Mount Isa

AAQ NEPM standard 0.20 ppm (1-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1983	*67.4**	*25*	*0.725*	*0.515*	*0.430*	*0.270*	*0.200*
1984	93.7	31	1.155	0.555	0.515	0.330	0.185
1985	97.3	7	1.080	0.325	0.210	0.100	0.055
1986	88.5	50	1.406	1.255	0.788	0.577	0.296
1987	98.9	51	1.755	1.016	0.853	0.546	0.324
1988	91.0*	31	0.798	0.682	0.562	0.342	0.159
1989	85.2	41	0.957	0.585	0.503	0.348	0.241
1990	*44.7**	*6*	*0.577*	*0.493*	*0.222*	*0.145*	*0.091*
1991	*54.8**	*28*	*0.673*	*0.638*	*0.440*	*0.294*	*0.215*
1992	88.5*	25	0.540	0.457	0.406	0.286	0.170
1993	95.6	24	0.718	0.434	0.403	0.282	0.134
1994	91.5	20	0.688	0.483	0.343	0.250	0.135
1995	98.9	11	0.443	0.254	0.239	0.184	0.109
1996	98.6	16	0.598	0.409	0.285	0.198	0.131
1997	98.9	7	0.300	0.256	0.216	0.128	0.083
1998	*48.8**	*16*	*0.693*	*0.548*	*0.368*	*0.265*	*0.190*
1999	90.4*	17	0.675	0.366	0.269	0.202	0.141
2000	96.4	31	0.584	0.373	0.357	0.250	0.191

2001	98.9	41	0.581	0.438	0.422	0.295	0.222
2002	91.2	49	1.254	0.551	0.526	0.385	0.272
2003	98.9	42	0.658	0.503	0.493	0.312	0.217
2004	97.5	36	0.888	0.665	0.444	0.302	0.207
2005	93.7*	49	0.964	0.663	0.512	0.395	0.271

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 41: Daily 24-hour sulfur dioxide summary 1993 to 2005

Trend station/region: Flinders View, south-east Queensland

AAQ NEPM standard 0.08 ppm (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1993	88.2*	0	0.006	0.005	0.005	0.004	0.003
1994	98.9	0	0.008	0.007	0.006	0.006	0.005
1995	*59.5**	*0*	*0.009*	*0.008*	*0.006*	*0.005*	*0.004*
1996	88.3*	0	0.010	0.005	0.005	0.004	0.004
1997	97.0	0	0.009	0.006	0.005	0.004	0.003
1998	95.9	0	0.011	0.007	0.006	0.004	0.004
1999	96.4	0	0.009	0.007	0.007	0.005	0.004
2000	89.9	0	0.013	0.012	0.008	0.006	0.005
2001	99.5	0	0.014	0.007	0.006	0.004	0.003
2002	97.0	0	0.006	0.006	0.005	0.003	0.003
2003	96.4	0	0.006	0.005	0.004	0.003	0.002
2004	99.5	0	0.007	0.006	0.005	0.003	0.003
2005	100.0	0	0.006	0.004	0.004	0.002	0.002

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 42: Daily 24-hour sulfur dioxide summary 1991 to 2005

Trend station/region: South Gladstone, Gladstone

AAQ NEPM standard 0.08 ppm (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1991	92.6	0	0.007	0.006	0.006	0.004	0.004
1992	94.3	0	0.012	0.011	0.010	0.009	0.008
1993	98.3	0	0.014	0.010	0.010	0.008	0.007
1994	97.0	0	0.013	0.007	0.007	0.006	0.005
1995	96.7	0	0.017	0.014	0.012	0.008	0.007
1996	99.2	0	0.010	0.007	0.006	0.005	0.004
1997	98.9	0	0.007	0.004	0.003	0.002	0.002
1998	97.5	0	0.012	0.010	0.007	0.005	0.003
1999	94.2	0	0.009	0.008	0.006	0.005	0.004
2000	84.7*	0	0.022	0.008	0.006	0.004	0.003
2001	98.1	0	0.006	0.005	0.004	0.003	0.002
2002	94.5	0	0.029	0.029	0.006	0.004	0.003
2003	93.2	0	0.013	0.011	0.007	0.005	0.003
2004	96.4	0	0.007	0.006	0.006	0.004	0.003
2005	98.9	0	0.011	0.009	0.006	0.004	0.004

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 43: Daily 24-hour sulfur dioxide summary 1984 to 2005

Trend station/region: Menzies, Mount Isa

AAQ NEPM standard
0.08 ppm (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1984	93.7	3	0.094	0.087	0.071	0.053	0.033
1985	97.3	1	0.111	0.050	0.042	0.030	0.024
1986	88.5	11	0.145	0.123	0.101	0.071	0.052
1987	98.9	12	0.158	0.110	0.099	0.060	0.044
1988	91.0*	3	0.123	0.091	0.064	0.041	0.032
1989	85.2	1	0.100	0.066	0.062	0.048	0.035
1990	*44.7**	*1*	*0.088*	*0.078*	*0.072*	*0.052*	*0.046*
1991	*54.8**	*3*	*0.117*	*0.100*	*0.073*	*0.053*	*0.038*
1992	88.5*	0	0.064	0.056	0.052	0.033	0.025
1993	95.6	0	0.064	0.052	0.046	0.040	0.027
1994	91.5	2	0.085	0.059	0.054	0.045	0.040
1995	98.9	0	0.049	0.036	0.028	0.018	0.012
1996	98.6	0	0.049	0.043	0.040	0.024	0.015
1997	98.9	0	0.034	0.028	0.022	0.016	0.010
1998	*48.8**	*0*	*0.055*	*0.041*	*0.037*	*0.029*	*0.019*
1999	90.4*	0	0.049	0.036	0.032	0.024	0.015
2000	96.4	0	0.078	0.070	0.055	0.032	0.019
2001	98.9	0	0.075	0.052	0.045	0.033	0.021
2002	91.2	1	0.081	0.057	0.055	0.043	0.033
2003	98.9	2	0.093	0.067	0.057	0.036	0.022
2004	97.5	1	0.100	0.069	0.050	0.034	0.017
2005	91.8*	2	0.091	0.069	0.060	0.044	0.032

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

Table 44: Daily 24-hour PM_{10} summary 1997 to 2005

Trend station/region: Rocklea, south-east Queensland

AAQ NEPM standard
50 µg/m³ (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)
1997	92.1	0	45.8	42.7	32.1	28.9	26.5
1998	90.1	0	34.7	32.4	29.1	25.7	23.3
1999	96.4	1	56.7	31.6	30.4	25.5	22.3
2000	92.3	0	47.6	40.6	38.1	32.8	27.0
2001	97.3	1	69.5	35.2	34.2	27.2	24.4
2002	99.2	8	177.2	95.3	60.1	35.0	30.9
2003	98.1	2	119.9	41.7	33.6	28.2	24.2
2004	92.6	2	52.4	44.5	39.9	33.5	28.8
2005	89.9	2	52.6	46.1	37.3	27.8	23.8

Table 45: Daily 24-hour PM_{10} summary 1999 to 2005

Trend station/region: Flinders View, south-east Queensland

AAQ NEPM standard 50 µg/m³ (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)
1999	95.3	0	44.2	28.4	25.5	20.3	17.9
2000	97.3	1	61.1	42.3	38.5	32.0	26.4
2001	99.7	0	42.5	37.5	35.0	25.5	22.9
2002	97.3	7	197.2	103.3	60.8	35.9	31.8
2003	94.8	1	119.1	35.1	30.5	26.0	23.0
2004	99.2	3	64.1	40.8	38.5	32.9	28.9
2005	97.0	3	64.3	44.7	40.7	26.8	24.0

Table 46: Daily 24-hour PM_{10} summary 2001 to 2005

Trend station/region: South Gladstone, Gladstone

AAQ NEPM standard 50 µg/m³ (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)
2001	95.6	4	66.6	51.6	36.0	30.3	25.9
2002	98.1	5	197.0	83.0	48.5	33.8	26.3
2003	96.4	0	41.3	35.5	33.1	26.2	23.2
2004	99.7	0	42.7	35.6	30.0	25.6	22.4
2005	97.8	4	196.7	53.8	37.1	26.6	23.0

Table 47: Daily 24-hour $PM_{2.5}$ summary 1998 to 2005

Trend station/region: Rocklea, south-east Queensland[a]

AAQ NEPM advisory standard 25 µg/m³ (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)
1998	80.1*	0	16.1	11.1	9.2	7.8	6.2
1999	88.8*	0	14.5	13.3	12.4	10.3	8.3
2000	96.4	3	37.4	20.2	17.7	14.1	10.8
2001	98.1	3	100.7	21.6	17.4	12.5	9.3
2002	94.2	3	47.3	26.0	17.9	13.4	11.1
2003	87.7	1	33.1	23.3	13.9	10.5	8.6
2004	94.5	5	29.7	28.7	22.5	17.2	11.6
2005	90.4*	0	15.3	13.1	11.1	9.5	8.1

[a]Monitoring by TEOM instrumentation in accordance with Technical Paper on Monitoring for Particles as $PM_{2.5}$

*Data availability less than 75 percent for one or more quarters.

Table 48: Daily 24-hour $PM_{2.5}$ summary 1999 to 2005

Trend station/region: Springwood, south-east Queensland[a] **AAQ NEPM advisory standard 25 µg/m³ (24-hour average)**

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)
1999	83.5*	0	22.3	12.9	12.0	8.7	7.1
2000	97.0	6	33.5	29.0	23.6	17.4	12.9
2001	96.2	0	19.4	18.0	16.2	11.8	9.1
2002	94.2	5	38.9	30.6	20.1	15.4	11.7
2003	96.2	0	20.5	16.2	15.4	10.9	9.3
2004	98.6	0	21.7	16.8	15.4	11.6	9.5
2005	96.4	0	15.2	13.9	12.3	10.2	8.5

[a]Monitoring by TEOM instrumentation in accordance with Technical Paper on Monitoring for Particles as $PM_{2.5}$

*Data availability less than 75 percent for one or more quarters.

Table 49: Annual lead summary 1980 to 2002

Trend station/region: Woolloongabba, south-east Queensland **AAQ NEPM standard 0.5 µg/m³ (annual average)**

Year	Data availability (%)	Annual average (µg/m³)
1980	91.8	2.21
1981	85.2*	2.69
1982	96.7	2.34
1983	96.7	2.21
1984	93.4	2.56
1985	86.9*	2.40
1986	100.0	1.90
1987	96.7	1.91
1988	98.4	2.13
1989	98.4	1.64
1990	98.4	1.47
1991	100.0	0.97
1992	90.2	0.63
1993	93.4	0.57
1994	96.7	0.48
1995	100.0	0.38
1996	98.4	0.25
1997	100.0	0.27
1998	*65.6*	*0.22*
1999	98.3	0.19
2000	88.5	0.14
2001	93.4	0.03
2002	96.7	0.02

*Data availability less than 75 percent for one or more quarters. Years shown in italics have less than 75 percent annual data availability.

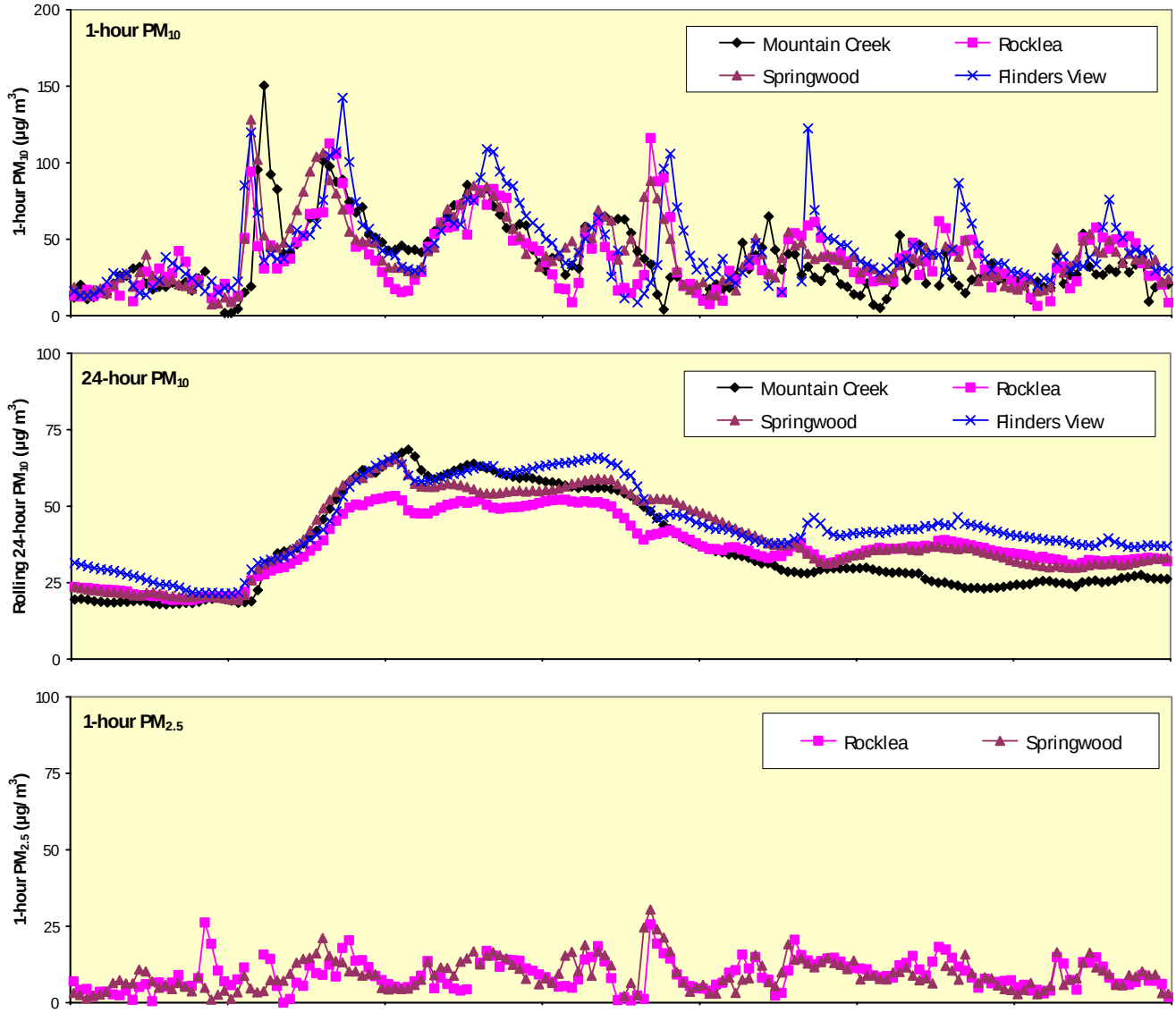
Appendix – Description of 2005 exceedence events

PM_{10} exceedences in all regions during February 2005

A vigorous cold front swept across Queensland on 2-3 February. Strong gusty south-west winds of up to 80km/h created a widespread dust storm affecting much of Queensland. Highest PM_{10} levels occurred at monitoring sites in Toowoomba, Gladstone, Mackay and Townsville. PM_{10} levels were lowest at south-east Queensland sites. Weakening of the cold front as it moved east meant that dust persisted in the atmosphere for several days following the initial dust storm in coastal areas of central and north Queensland. Daily average PM_{10} levels were above the Air NEPM standard for up to five days in Gladstone, Mackay and Townsville.

$PM_{2.5}$ and Bsp (nephelometer) measurements were considerably lower than the corresponding PM_{10} measurements, indicating a high proportion of coarse particles consistent with wind-blown dust particles (figures 2 and 3).

Figure 2: Particle concentrations at south-east Queensland monitoring sites over the period 2-8 February 2005.



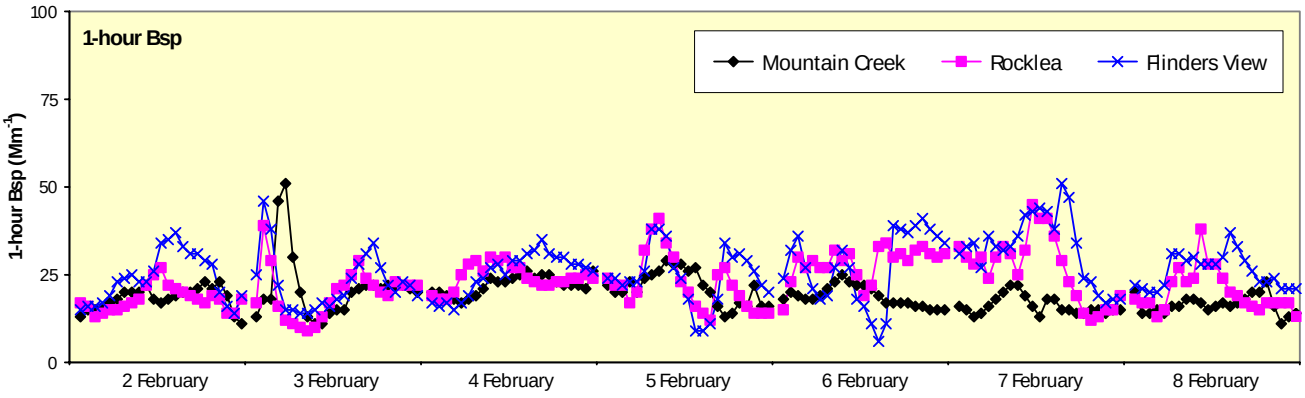
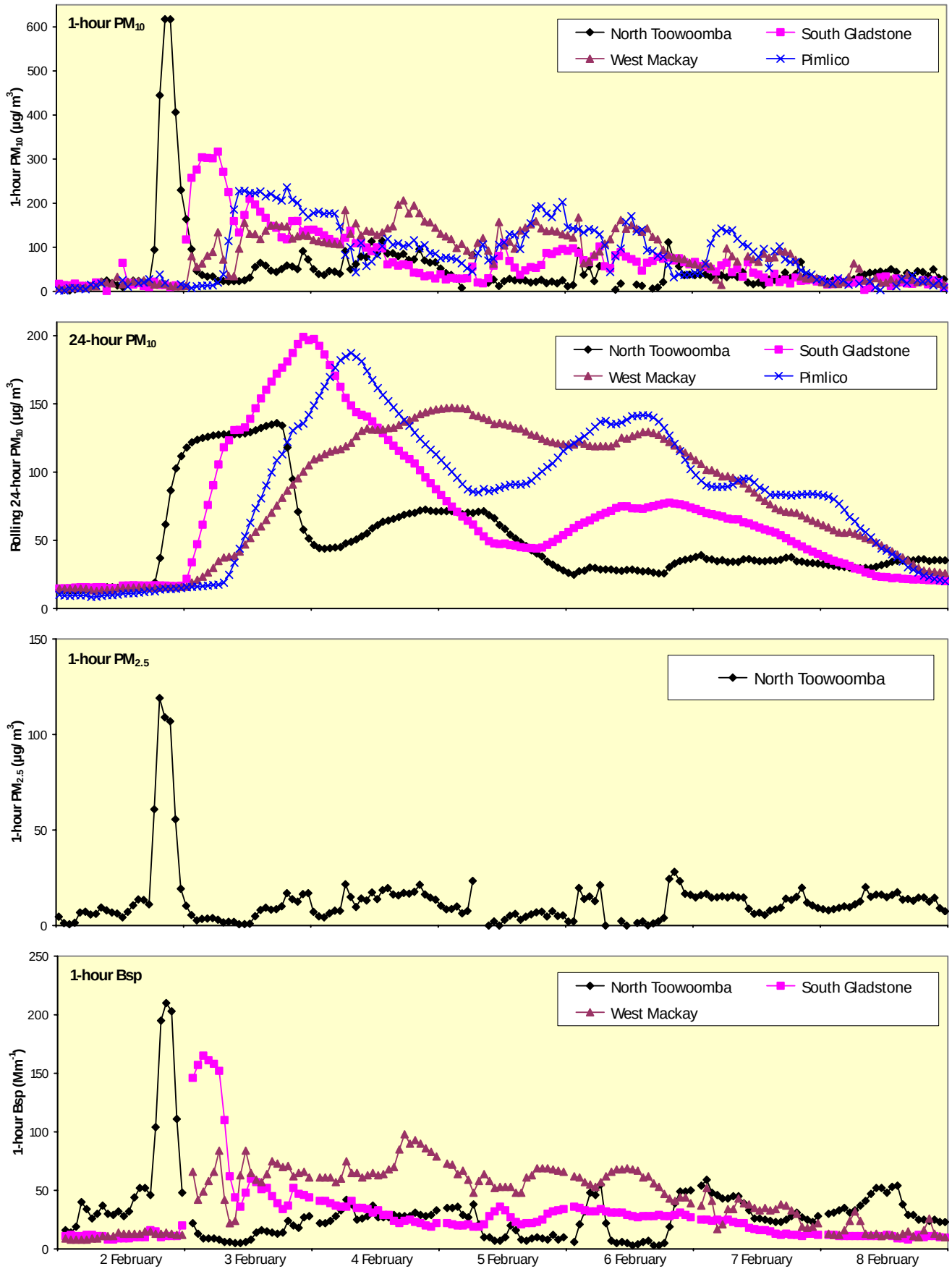

1-hour Bsp
Mountain Creek
Rocklea
Flinders View
1-hour Bsp (Mm-1)
100
75
50
25
0
2 February
3 February
4 February
5 February
6 February
7 February
8 February

Figure 3: Particle concentrations at Toowoomba, Gladstone, Mackay and Townsville monitoring sites over the period 2-8 February 2005.

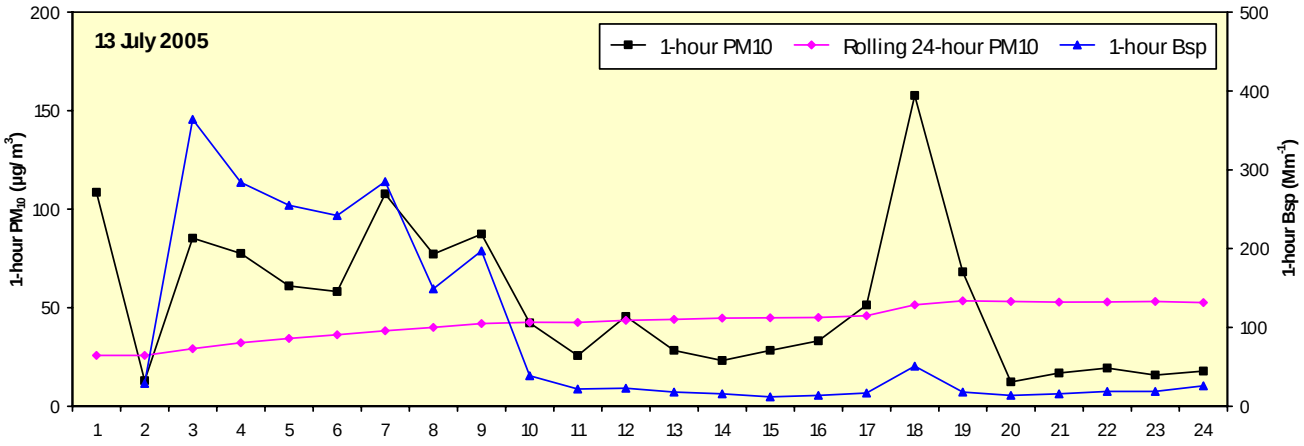


PM_{10} exceedence at West Mackay on 13 July 2005

A major source of airborne particles in the Mackay region has been pre- and post-harvest burning of sugar cane in the Pioneer Valley west of Mackay during the crushing season from June to November each year. Smoke from agricultural burning contributed to an exceedence of the AAQ NEPM PM_{10} standard at the West Mackay site on 13 July. Figure 4 shows that elevated PM_{10} levels from midnight to 9:00am on 13 July correlate with elevated Bsp measurements, confirming a high proportion of fine particles. Winds during this period were westerly. This evidence is consistent with smoke particles being transported from agricultural areas in the Pioneer Valley at the time. With increasing amounts of cane being harvested green (over 97 percent in 2004), occurrences of agricultural smoke impacts in Mackay have decreased in recent years.

Also contributing to the AAQ NEPM PM_{10} standard exceedence on 13 July was a period of high PM_{10} levels in the late afternoon, most likely due to local dust generating activities. In recent years commercial activities involving loading and unloading of soils have commenced in the vicinity of the monitoring site, leading to infrequent but significant local dust episodes. Low Bsp measurements and north-easterly winds during this period point to coarse dust particles, rather than smoke from agricultural burning, being responsible for these elevated PM_{10} measurements.

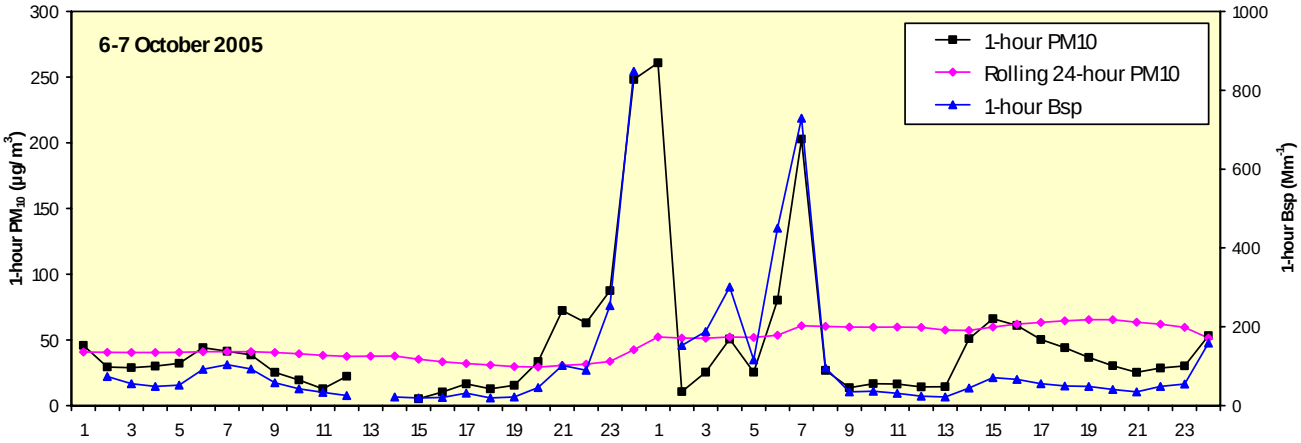
Figure 4: Particle concentrations at the West Mackay site on 13 July 2005.



PM_{10} exceedence at Flinders View on 7 October 2005

High temperatures, low humidity and strong winds led to numerous grass and bushfires in south-east Queensland over the period 6-10 October 2005. On 6-7 October smoke from two nearby grass fires was carried over the Flinders View monitoring site, leading to an exceedence of the AAQ NEPM PM_{10} standard on 7 October. As figure 5 shows, the highest PM_{10} concentrations on 7 October occurred at 1am and again at 7am. Winds at 1am were easterly, consistent with smoke coming from a grass fire situated 3km away at Patrick St, Swanbank. Winds at 7am were southerly, consistent with smoke coming from a grass fire situated 4km away at Wensley Rd, Ripley. The good correlation observed between PM_{10} and Bsp (nephelometer) measurements also confirmed a high proportion of fine particles, consistent with the presence of smoke particles.

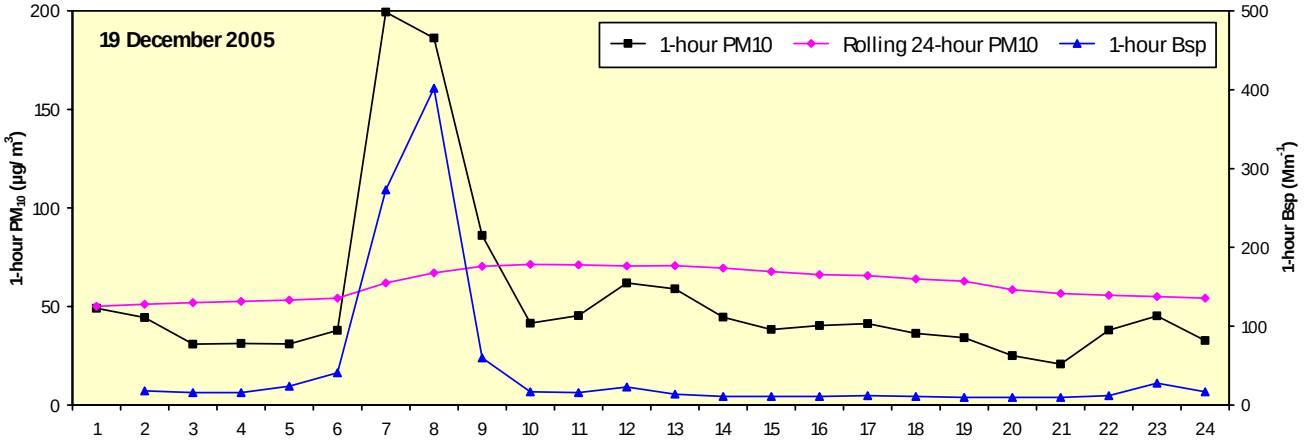
Figure 5: Particle concentrations at the Flinders View site on 6-7 October 2005.


6-7 October 2005
1-hour PM10
Rolling 24-hour PM10
1-hour Bsp
1-hour PM10 (µg/ m3)
1-hour Bsp (Mm-1)
300
250
200
150
100
50
0
1000
800
600
400
200
0
1 3 5 7 9 11 13 15 17 19 21 23 1 3 5 7 9 11 13 15 17 19 21 23

PM_{10} exceedence at West Mackay on 19 December 2005

During December 2005 planned grazing management burning was conducted in grazing areas south-west of Mackay. The onset of hot dry windy conditions caused some of these fires to escape containment lines and spread into neighbouring State Forest and freehold land where they burned for up to five weeks. While for the most part smoke from these fires did not impact on air quality in Mackay, high PM_{10} measurements were recorded at the West Mackay monitoring site on the morning of 19 December during south-westerly winds (figure 6) The high PM_{10} measurements were associated with elevated Bsp (nephelometer) readings, consistent with the presence of a high proportion of fine smoke particles. PM_{10} levels fell rapidly from 8am as winds shifted to an easterly direction. The resulting 24-hour PM_{10} concentration at the West Mackay monitoring site on 19 December was 52.6µg/m^3.

Figure 6: Particle concentrations at the West Mackay site on 19 December 2005.

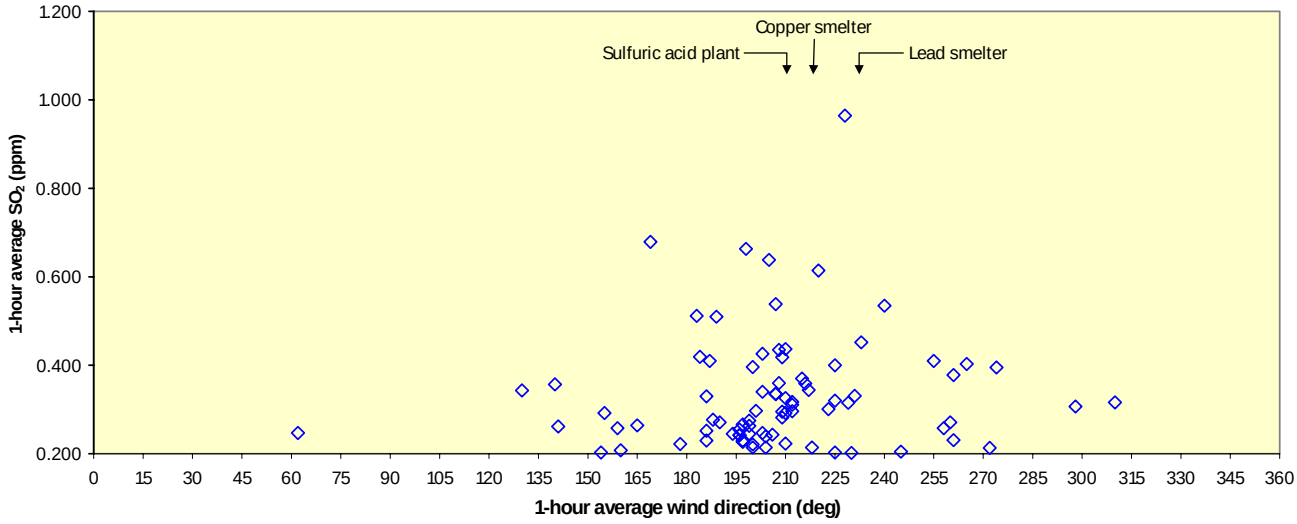


Sulfur dioxide exceedences at Menzies in 2005

Industrial operations (metals smelting and sulfuric acid manufacture) emit sulfur dioxide into the atmosphere in Mount Isa. Under the *Mount Isa Mines Agreement Act 1985*, smelter operations must be managed to maintain ambient sulfur dioxide concentrations in Mount Isa below the levels specified in the Act (these are currently equivalent to the USEPA three-hour secondary, 24-hour primary and annual average primary sulfur dioxide standards). As smelter operations are only controlled to meet *Mount Isa Mines Agreement Act 1985* air quality limits, sulfur dioxide levels can exceed the more stringent Air NEPM one-hour and 24-hour standards on occasions.

The smelter and sulfuric acid manufacturing plant are situated to the south-southwest of the Menzies monitoring site. The relationship between wind direction and one-hour average sulfur dioxide concentrations greater than 0.200ppm (figure 7) demonstrates that exceedences predominantly occur when the wind is blowing from these plants towards the Menzies site.

Figure 7: Relationship between wind direction and 1-hour average sulfur dioxide concentrations at the Menzies site during 2005.


Copper smelter
Sulfuric acid plant
Lead smelter
1-hour average SO_2 (ppm)
1.200
1.000
0.800
0.600
0.400
0.200
0 15 30 45 60 75 90 105 120 135 150 165 180 195 210 225 240 255 270 285 300 315 330 345 360
1-hour average wind direction (deg)