Queensland

2007 air monitoring report

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

Queensland Government
Environmental Protection Agency

Visit us online at: ***www.epa.qld.gov.au***

July 2008

Printed on 100% recycled paper.

Queensland
2007 air monitoring report

List of tables

List of figures

Summary
Air monitoring at National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM) monitoring stations in Queensland between January and December 2007 indicated that exceedences of the AAQ NEPM standards occurred for:

- 1-hour sulfur dioxide at the Menzies site in Mount Isa due to industrial emissions;
- 24-hour sulfur dioxide at the Menzies site in Mount Isa due to industrial emissions;
- 24-hour particles with an aerodynamic diameter less than 10µm (PM_{10}) at the Rocklea site in south-east Queensland and the North Toowoomba site due to wind blown dust, and at the West Mackay site due to locally generated dust from activities at adjoining commercial premises; and
- 24-hour particles with an aerodynamic diameter less than 2.5µm ($PM_{2.5}$) due to smoke from bushfires and hazard-reduction burns at the Springwood site in south-east Queensland.

The AAQ NEPM 2008 goal was met in all regions during 2007, with the exception of:

- 1-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 carbon monoxide at the Woolloongabba monitoring site and nitrogen dioxide at the Deception Bay monitoring site in 2007 because data availability was below the level required to make a valid assessment.

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 2007 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 2007.

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 2007 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 2007 follow.

Current AAQ NEPM monitoring stations
During 2007 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: 2007 AAQ NEPM monitoring station locations

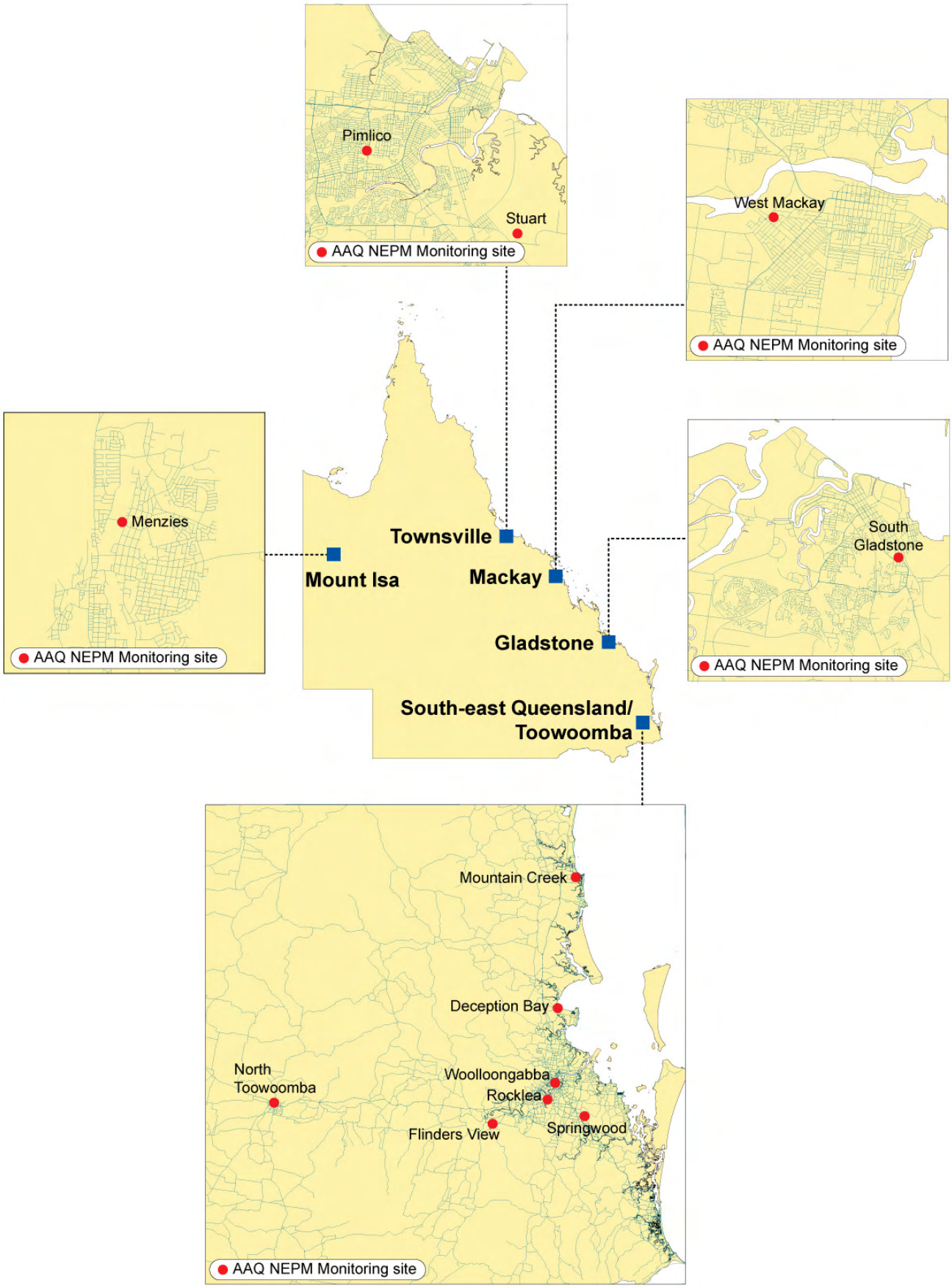


Table 1: 2007 Queensland AAQ NEPM monitoring sites

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: 2007 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 air sampler) TEOM, based on AS3580.9.8-2001	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 AS3580.9.8-2001	High	Nil	Major roads Solid fuel heaters

Table 1: 2007 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)
Mackay							
West Mackay	PMS - GRUB	September 1997	PM_{10}	AS3580.9.8-2001	Medium	Extraneous sources nearby	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 2007 the EPA continued to monitor ambient air quality in the same six regions as in 2006. $PM_{2.5}$ monitoring using reference samplers on a one in three day basis continued at the Rocklea and Springwood sites in south-east Queensland as required under the AAQ NEPM $PM_{2.5}$ Equivalence Program.

Variations to the approved monitoring plan for Queensland

On the basis of the results of monitoring conducted in larger population centres and/or the findings of generic modelling studies detailed in Appendix A of the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures", it has been concluded that campaign monitoring of nitrogen dioxide in Bundaberg, Cairns, Mackay, Maryborough/Hervey Bay and Rockhampton, and campaign monitoring of ozone in Bundaberg, Mackay and Maryborough/Hervey Bay is not required as it is reasonable to expect that pollutant levels will be consistently below the relevant NEPM standards (i.e. performance is "met").

Delays in establishing monitoring in other centres, commitments under the AAQ NEPM $PM_{2.5}$ Equivalency Program and other monitoring priorities have meant that it has not been possible to begin the following monitoring according to the timeframes set out in the monitoring plan for Queensland:

- ozone and PM_{10} in Cairns,
- ozone, sulfur dioxide and PM_{10} in Rockhampton,
- PM_{10} in Bundaberg,
- PM_{10} in Maryborough/Hervey Bay, and
- PM_{10} and lead in Mount Isa.

Section B – Assessment of compliance with standards and 2008 goal

This section provides details of the annual compliance assessment for January to December 2007. 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 carbon monoxide at the Woolloongabba monitoring station and nitrogen dioxide at the Deception Bay monitoring station.

Tables 2 to 7 summarise compliance of monitoring with the standards and 2008 goal for AAQ NEPM pollutants for 2007. 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: 2007 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	95.5	4.4	0.0	0.0	24.6	0	ND
Toowoomba North Toowoomba	95.0	95.4	92.9	85.7	92.2	0	met

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
- 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 2007 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: 2007 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	95.0	95.4	95.3	94.7	95.1	0	0.004	met	met
Brisbane sub-region									
Deception Bay	94.3	95.3	95.1	71.7	89.1	0	0.006	ND	ND
Rocklea	94.8	95.6	95.1	94.9	95.1	0	0.008	met	met
Springwood	99.6	96.1	99.7	98.9	98.6	0	0.006	met	met
Ipswich sub-region									
Flinders View	93.8	95.3	95.4	79.8	91.0	0	0.008	met	met
Toowoomba									
North Toowoomba	95.3	95.2	92.9	81.7	91.2	0	0.005	met	met
Gladstone									
South Gladstone	95.0	95.3	95.4	88.0	93.4	0	0.005	met	met
Townsville									
Pimlico	91.0	95.7	95.1	95.6	94.3	0	0.004	met	met

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
- Mount Isa
- Rockhampton

Appendix A of the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures" states that nitrogen dioxide monitoring is not required in coastal and inland centres with a population below 250 000 on the basis of generic modelling conducted by CSIRO (procedure E in Table 1) coupled with data from a NEPM compliant region with greater population, emissions and pollution potential showing nitrogen dioxide levels are below 40 percent of the NEPM standards (procedure F in Table 1).

Monitoring at the Pimlico site in Townsville over the period 2004 to 2007 has shown nitrogen dioxide levels to be consistently below 40 percent of the NEPM standards. The maximum 1-hour average nitrogen dioxide concentration during this period was 0.035ppm (29 percent of the standard). The highest annual average nitrogen dioxide concentration during this period was 0.006ppm (20 percent of the standard).

On this basis, nitrogen dioxide monitoring in the coastal Queensland centres of Bundaberg, Cairns, Mackay, Maryborough/Hervey Bay and Rockhampton as these centres can be considered to comply with the NEPM 1-hour and annual nitrogen dioxide standards.

Mount Isa satisfies screening criteria for nitrogen dioxide by generic modelling alone (procedure E in Table 1) and can be considered to comply with the NEPM 1-hour and annual nitrogen dioxide standards.

Ozone

Table 4: 2007 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	92.9	92.5	95.2	93.8	93.6	0	0	met	met
Brisbane sub-region									
Deception Bay	94.4	95.3	95.3	92.1	94.3	0	0	met	met
Rocklea	75.5	95.6	94.9	94.9	90.3	0	0	met	met
Springwood	98.5	89.6	95.7	97.3	95.3	0	0	met	met
Ipswich sub-region									
Flinders View	93.8	95.2	95.4	94.8	94.8	0	0	met	met
Toowoomba									
North Toowoomba	95.2	95.2	92.9	94.0	94.3	0	0	met	met
Townsville									
Pimlico	95.3	95.7	93.7	95.1	94.9	0	0	met	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
- Gladstone
- Mackay
- Maryborough/Hervey Bay
- Mount Isa

From 2001 to mid-2006, ozone concentrations were monitored at Targinie in the Gladstone region. The Targinie campaign GRUB monitoring station was located 20km north-west of Gladstone and downwind of the major industrial and transport emission sources in the region. Ozone concentrations measured at the Targinie campaign monitoring station over this period were consistently less than 75 percent of the AAQ NEPM standards (maximum 1-hour average 0.056ppm ; maximum 4-hour average 0.046ppm). On this basis, ozone monitoring in Gladstone is not required under screening procedure A in Table 2 of the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures". The EPA will re-evaluate the need for ozone monitoring in Gladstone should sources of precursor emissions in the region increase significantly.

Appendix A of the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures" states that ozone monitoring is not required in coastal centres with a population below 62 000 and inland centres with a population below 25 000 on the basis of generic modelling conducted by CSIRO (procedure E in Table 1).

On this basis, ozone monitoring is not required in the coastal Queensland centres of Bundaberg, Mackay and Maryborough/Hervey Bay, and the inland centre of Mount Isa, as these centres can be considered to comply with the NEPM 1-hour and 4-hour ozone standards.

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

- Cairns
- Rockhampton

Sulfur dioxide

Table 5: 2007 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	99.3	90.3	96.6	97.5	95.9	0	0	0.001	met	met	met
Ipswich sub-region											
Flinders View	91.9	93.8	95.4	93.3	93.6	0	0	0.001	met	met	met
Gladstone											
South Gladstone	95.0	95.2	95.4	88.0	93.4	0	0	0.002	met	met	met
Townsville											
Pimlico	95.0	95.7	86.6	95.5	93.2	0	0	0.001	met	met	met
Stuart	95.8	81.0	94.6	95.3	91.7	0	0	0.000	met	met	met
Mount Isa											
Menzies	94.5	95.7	94.2	81.1	91.3	31	1	0.007	not met	met	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
- 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: 2007 compliance summary for PM_{10} in Queensland

AAQ NEPM Standard
50 µg/m^3 (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	100.0	100.0	98.9	98.9	0	met
Brisbane sub-region							
Rocklea	97.8	100.0	98.9	100.0	99.2	1	met
Springwood	100.0	96.7	100.0	100.0	99.2	0	met
Ipswich sub-region							
Flinders View	97.8	100.0	98.9	100.0	99.2	0	met
Toowoomba							
North Toowoomba	100.0	97.8	94.6	97.8	97.5	1	met
Gladstone							
South Gladstone	97.8	100.0	100.0	89.1	96.7	0	met
Mackay							
West Mackay	91.1	91.2	100.0	100.0	95.6	2	met
Townsville							
Pimlico	100.0	83.5	98.9	93.5	94.0	0	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: 2007 compliance summary for $PM_{2.5}$ in Queensland

AAQ NEPM Advisory Standard
25 µg/m^3 (24-hour average)
8 µg/m^3 (1-year average)

Region/ Performance monitoring station	Data availability rates (% of days)					Number of exceedences (days)	Annual mean (µg/m^3)
	Q1	Q2	Q3	Q4	Annual		
South-east Queensland							
Brisbane sub-region							
Rocklea†	24.4	29.7	26.1	31.5	27.9	0	6.1
Rocklea‡	100.0	100.0	100.0	100.0	100.0	0	4.3
Springwood†	28.9	33.0	29.3	28.3	29.9	1	5.9
Springwood‡	100.0	97.8	96.7	98.9	98.4	0	4.3
Toowoomba							
North Toowoomba‡	100.0	100.0	95.7	76.1	92.9	0	3.6

†Monitoring by reference method (1 in 3 days)
‡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:

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

Lead

No lead monitoring was conducted in Queensland in 2007. 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

Sources of airborne lead in Mount Isa are smelting operations and wind blown dust from mined ore stockpiles and natural soil concentrations. The EPA will commence ambient TSP lead monitoring in 2008.

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 2007. 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. 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 $PM_{2.5}$.

Exceedence details are provided in tables 8 to 10. Summary maxima statistics are provided in tables 11 to 18.

Exceedence summary

During 2007, exceedences of AAQ NEPM standards occurred for sulfur dioxide and PM_{10}. The AAQ NEPM 24-hour $PM_{2.5}$ advisory reporting standard was exceeded. There were no exceedences of the AAQ NEPM standards for ozone, carbon monoxide and nitrogen dioxide. Lead monitoring was not conducted in 2007, 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.

Additional information on the circumstances which led to exceedences of standards during 2007 is provided in an appendix.

Table 8: 2007 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	0.608	Jan21	15	Industry emissions
		0.503	Jan21	22	Industry emissions
		0.471	Jan21	23	Industry emissions
		0.448	Jan13	18	Industry emissions
		0.443	Dec01	13	Industry emissions
		0.408	Jan22	04	Industry emissions
		0.407	Mar09	16	Industry emissions
		0.381	Apr29	17	Industry emissions
		0.375	Oct31	09	Industry emissions
		0.355	Jan06	16	Industry emissions
		0.353	Nov15	15	Industry emissions
		0.336	Nov28	17	Industry emissions
		0.325	Jan21	24	Industry emissions
		0.324	Jan21	19	Industry emissions
		0.320	Feb12	15	Industry emissions
		0.309	Jan21	16	Industry emissions
		0.307	Jun29	17	Industry emissions
		0.307	Dec02	19	Industry emissions
		0.303	Oct25	15	Industry emissions
		0.303	Nov25	17	Industry emissions
		0.300	Sep12	17	Industry emissions
		0.295	Dec14	17	Industry emissions
		0.291	Jan22	03	Industry emissions
		0.289	Jan21	20	Industry emissions
		0.282	Nov11	19	Industry emissions
		0.282	Nov26	14	Industry emissions
		0.282	Jan21	18	Industry emissions
		0.280	Jan21	17	Industry emissions
		0.280	Nov15	16	Industry emissions
		0.275	Jan08	09	Industry emissions
		0.272	Dec01	12	Industry emissions
		0.260	Jan22	02	Industry emissions
		0.260	Dec07	17	Industry emissions
		0.257	Dec04	17	Industry emissions
		0.240	Nov26	15	Industry emissions
		0.237	Jan21	12	Industry emissions
		0.237	Jan21	21	Industry emissions
		0.236	Sep12	15	Industry emissions
		0.236	Nov15	18	Industry emissions
		0.232	Nov07	16	Industry emissions
		0.229	Dec09	21	Industry emissions
		0.227	May17	18	Industry emissions
		0.221	Nov09	15	Industry emissions
		0.220	Dec14	18	Industry emissions
		0.219	Nov06	18	Industry emissions
		0.213	Feb11	17	Industry emissions
		0.212	Nov25	15	Industry emissions
		0.208	Nov09	17	Industry emissions
		0.207	Feb15	18	Industry emissions
		0.207	Nov02	17	Industry emissions
		0.205	Oct25	17	Industry emissions
		0.205	Nov09	16	Industry emissions
		0.205	Nov15	19	Industry emissions
		0.203	Aug15	17	Industry emissions

Table 8: 2007 sulfur dioxide exceedences in Queensland (continued)

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	24-hour	0.199	Jan21	24	Industry emissions

Table 9: 2007 PM_{10} exceedences in Queensland

AAQ NEPM standard
50 µg/m^3 (24-hour average)

Region/ Performance monitoring station	Concentration (µg/m^3)	Date	Time	Circumstances
South-east Queensland Rocklea	53.4	Jul05	24	Wind blown dust
Toowoomba North Toowoomba	51.5	Sep20	24	Wind blown dust
Mackay West Mackay	61.1	Aug06	24	Dust-generating activities (movement of soil stockpiles) at commercial premises close to monitoring site (not indicative of general population exposure)
	50.7	Sep18	24	Dust-generating activities (movement of soil stockpiles) at commercial premises close to monitoring site (not indicative of general population exposure)

Table 10: 2007 $PM_{2.5}$ exceedences in Queensland

AAQ NEPM standard
25 µg/m^3 (24-hour average)
8 µg/m^3 (1-year average)

Region/ Performance monitoring station	Standard	Concentration (µg/m^3)	Date	Time	Circumstances
South-east Queensland Springwood	24-hour	29.2	Aug01	24	Smoke from bushfires and hazard-reduction burns

2007 maximum, second-highest and sixth-highest concentration summaries

Table 11: 2007 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	95	1.1	Jan25:18 Mar20:22 Mar28:22	1.1	
Toowoomba					
North Toowoomba	356	2.2	Jul28:02	1.8	Jul08:03 Jul27:24

Table 12: 2007 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					
Mountain Creek	365	0.034	Aug13:19	0.032	May23:18
Deception Bay	344	0.063	Jul12:20	0.049	Jul13:08
Rocklea	365	0.044	Jul27:20 Aug01:11	0.044	
Springwood	365	0.042	Jul17:21	0.036	Jul20:23
Flinders View	351	0.039	Jun15:19	0.037	Jul26:21
Toowoomba					
North Toowoomba	352	0.043	Oct27:20	0.042	May04:20
Gladstone					
South Gladstone	359	0.035	Jun18:15	0.032	Oct17:10
Townsville					
Pimlico	362	0.035	Aug22:20	0.032	Aug24:21

Table 13: 2007 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					
Mountain Creek	362	0.053	Oct08:24	0.050	Mar12:13
Deception Bay	363	0.086	Mar12:14	0.059	Mar11:15
Rocklea	349	0.076	Jan29:15	0.072	Oct04:15
Springwood	364	0.042	Sep28:15	0.039	Oct09:15
Flinders View	365	0.069	Oct05:14	0.063	Oct24:15
Toowoomba					
North Toowoomba	364	0.062	Mar12:19	0.060	Oct23:16
Townsville					
Pimlico	365	0.049	Sep18:12	0.047	Aug22:13

Table 14: 2007 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					
Mountain Creek	362	0.049	Oct09:02	0.046	Aug13:16
Deception Bay	364	0.070	Mar12:16	0.055	Mar30:17
Rocklea	350	0.067	Mar12:15	0.062	Jan29:16
Springwood	363	0.038	Sep28:17	0.036	Oct09:16
Flinders View	365	0.062	Oct05:16	0.060	Oct02:16
Toowoomba					
North Toowoomba	364	0.056	Oct20:17 Oct23:17 Oct27:17	0.056	
Townsville					
Pimlico	365	0.046	Aug22:16	0.043	Oct14:15

Table 15: 2007 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					
Springwood	364	0.012	Aug05:10	0.009	Jul27:11 Aug11:20
Flinders View	365	0.026	Jan18:09 Feb02:19	0.026	
Gladstone					
South Gladstone	359	0.075	Jan04:12	0.071	Nov12:14
Townsville					
Pimlico	358	0.005	Apr12:21 Jun21:09 Jul18:16 Aug11:17	0.005	
Stuart	352	0.005	Oct23:16	0.003	Aug23:05 Aug25:05 Aug26:05
Mount Isa					
Menzies	353	0.608	Jan21:15	0.448	Jan13:18

Table 16: 2007 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					
Springwood	349	0.003	May04	0.002	May18 Aug03
Flinders View	363	0.006	Feb02	0.005	Jan03 Feb26
Gladstone					
South Gladstone	356	0.021	Jan04	0.014	Jan03
Townsville					
Pimlico	354	0.003	Jan13 May25 Jun21 Jun27	0.003	
Stuart	350	0.002	Oct23	0.001	11 days in total
Mount Isa					
Menzies	345	0.199	Jan21	0.061	Feb12

Table 17: 2007 summary statistics for 24-hour PM_{10} in Queensland

AAQ NEPM standard
50 µg/m^3 (24-hour average)

Region/ Performance monitoring station	Number of valid days	Highest (µg/m^3)	Highest (date)	6th highest (µg/m^3)	6th highest (date)
South-east Queensland					
Mountain Creek	361	41.9	Jul05	31.9	Nov05
Rocklea	362	53.4	Jul05	39.0	Oct17
Springwood	362	49.3	Oct05	37.1	Oct17
Flinders View	362	44.6	Oct05	36.9	Aug13
Toowoomba					
North Toowoomba	356	51.5	Sep20	37.7	Oct05
Gladstone					
South Gladstone	353	38.8	Oct18	29.1	Mar01
Mackay					
West Mackay	349	61.1	Aug06	47.1	Jul06
Townsville					
Pimlico	343	29.1	Sep30	24.4	Oct15

Table 18: 2007 summary statistics for 24-hour $PM_{2.5}$ in Queensland

AAQ NEPM advisory reporting standard
25 µg/m^3 (24-hour average)
8 µg/m^3 (1-year average)

Region/ Performance monitoring station	Number of valid days	Highest (µg/m^3)	Highest (date)
South-east Queensland			
Rocklea†	102	21.9	Jul20
Rocklea‡	365	19.3	Jul28
Springwood†	109	29.2	Aug01
Springwood‡	359	17.9	Aug13
Toowoomba			
North Toowoomba‡	339	17.8	Aug07

†Monitoring by reference method (1 in 3 days)

‡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 2007 (tables 19 to 26), and multi-year data for nominated trend stations in the Queensland air monitoring plan (tables 27 to 50).

2007 pollutant distribution information

Table 19: Percentiles of daily peak 8-hour carbon monoxide concentrations for 2007

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	26.0	1.1	1.1	1.1	1.1	1.0	0.8	0.7
Toowoomba								
North Toowoomba	97.5	2.2	1.8	1.6	1.0	0.4	0.1	0.0

Table 20: Percentiles of daily peak 1-hour nitrogen dioxide concentrations for 2007

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	0.034	0.030	0.028	0.026	0.022	0.015	0.009
Deception Bay	94.2	0.063	0.035	0.033	0.030	0.027	0.020	0.014
Rocklea	100.0	0.044	0.041	0.040	0.035	0.031	0.022	0.015
Springwood	100.0	0.042	0.033	0.033	0.030	0.027	0.022	0.015
Flinders View	96.2	0.039	0.036	0.035	0.031	0.029	0.022	0.017
Toowoomba								
North Toowoomba	96.4	0.043	0.039	0.038	0.034	0.029	0.020	0.010
Gladstone								
South Gladstone	98.4	0.035	0.030	0.029	0.027	0.024	0.019	0.013
Townsville								
Pimlico	99.2	0.035	0.027	0.024	0.023	0.020	0.016	0.011

Table 21: Percentiles of daily peak 1-hour ozone concentrations for 2007

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	99.2	0.053	0.048	0.046	0.040	0.036	0.032	0.027
Deception Bay	99.5	0.086	0.056	0.054	0.047	0.042	0.036	0.029
Rocklea	95.6	0.076	0.070	0.059	0.052	0.049	0.038	0.033
Springwood	99.7	0.042	0.038	0.036	0.032	0.029	0.024	0.020
Flinders View	100.0	0.069	0.062	0.060	0.055	0.050	0.041	0.032
Toowoomba								
North Toowoomba	99.7	0.062	0.057	0.056	0.050	0.046	0.040	0.033
Townsville								
Pimlico	100.0	0.049	0.043	0.040	0.038	0.036	0.032	0.026

Table 22: Percentiles of daily peak 4-hour ozone concentrations for 2007

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	99.2	0.049	0.044	0.042	0.038	0.034	0.031	0.025
Deception Bay	99.7	0.070	0.052	0.050	0.044	0.040	0.034	0.028
Rocklea	95.9	0.067	0.058	0.053	0.048	0.043	0.036	0.031
Springwood	99.5	0.038	0.033	0.033	0.030	0.026	0.022	0.018
Flinders View	100.0	0.062	0.056	0.054	0.049	0.045	0.037	0.030
Toowoomba								
North Toowoomba	99.7	0.056	0.054	0.051	0.046	0.043	0.038	0.032
Townsville								
Pimlico	100.0	0.046	0.042	0.038	0.036	0.034	0.031	0.024

Table 23: Percentiles of daily peak 1-hour sulfur dioxide concentrations for 2007

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	0.012	0.009	0.008	0.006	0.004	0.002	0.001
Flinders View	100.0	0.026	0.024	0.022	0.018	0.014	0.007	0.003
Gladstone								
South Gladstone	98.4	0.075	0.069	0.061	0.044	0.035	0.017	0.007
Townsville								
Pimlico	98.1	0.005	0.005	0.004	0.003	0.003	0.002	0.001
Stuart	96.4	0.005	0.003	0.002	0.002	0.001	0.001	0.001
Mount Isa								
Menzies	96.7	0.608	0.408	0.375	0.282	0.185	0.045	0.002

Table 24: Percentiles of daily 24-hour sulfur dioxide concentrations for 2007

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	95.6	0.003	0.002	0.002	0.002	0.001	0.001	0.000
Flinders View	99.5	0.006	0.004	0.004	0.003	0.002	0.001	0.001
Gladstone								
South Gladstone	97.5	0.021	0.012	0.010	0.007	0.005	0.003	0.001
Townsville								
Pimlico	97.0	0.003	0.003	0.002	0.002	0.001	0.001	0.001
Stuart	95.9	0.002	0.001	0.001	0.001	0.001	0.000	0.000
Mount Isa								
Menzies	94.5	0.199	0.060	0.046	0.036	0.023	0.005	0.001

Table 25: Percentiles of daily 24-hour PM_{10} concentrations for 2007

AAQ NEPM standard
50 µg/m^3 (24-hour average)

	Data availability rates (%)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)	75th percentile (µg/m^3)	50th percentile (µg/m^3)
South-east Queensland								
Mountain Creek	98.9	41.9	34.4	31.1	24.0	21.1	17.3	13.7
Rocklea	99.2	53.4	41.4	38.9	32.1	26.7	20.3	16.8
Springwood	99.2	49.3	43.8	35.9	28.4	24.1	18.2	14.6
Flinders View	99.2	44.6	39.6	36.7	28.3	23.4	18.7	15.2
Toowoomba								
North Toowoomba	97.5	51.5	43.0	36.6	27.2	24.0	17.9	12.6
Gladstone								
South Gladstone	96.7	38.8	29.5	28.4	25.4	22.9	19.2	15.2
Mackay								
West Mackay	95.6	61.1	49.1	46.1	38.5	33.1	26.7	20.5
Townsville								
Pimlico	94.0	29.1	26.9	24.2	20.5	18.3	15.2	12.4

Table 26: Percentiles of daily 24-hour $PM_{2.5}$ concentrations for 2007

AAQ NEPM advisory reporting standards
25 µg/m^3 (24-hour average)
8 µg/m^3 (1-year average)

	Data availability rates (%)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)	75th percentile (µg/m^3)	50th percentile (µg/m^3)
South-east Queensland								
Rocklea†	27.9	21.5	21.5	17.5	14.2	10.6	6.6	5.5
Rocklea‡	100.0	19.3	16.4	13.5	10.6	8.2	5.4	3.7
Springwood†	29.9	29.2	29.2	21.0	13.4	9.8	7.2	5.0
Springwood\‡	98.4	17.9	12.8	12.1	9.2	7.8	5.2	3.7
Toowoomba								
North Toowoomba‡	92.9	17.8	11.9	10.8	8.7	6.8	5.0	3.1

†Monitoring by reference method (1 in 3 days)

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

Multi-year statistics for trend stations

Table 27: 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 28: Daily peak 8-hour carbon monoxide summary 1998 to 2007

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
2006	95.3	0	4.0	3.7	3.1	2.4	2.1
2007	*26.0**	*0*	*1.1*	*1.1*	*1.1*	*1.1*	*1.0*

*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 1995 to 2007

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)	Annual average (ppm)
1995	93.4	0	0.058	0.054	0.046	0.038	0.033	0.007
1996	*68.6**	*0*	*0.048*	*0.043*	*0.042*	*0.034*	*0.030*	*0.007*
1997	95.6	0	0.043	0.038	0.036	0.032	0.028	0.007
1998	97.5	0	0.066	0.050	0.039	0.031	0.026	0.006
1999	96.4	0	0.058	0.039	0.030	0.028	0.024	0.006
2000	99.5	0	0.053	0.038	0.034	0.029	0.025	0.005
2001	95.1	0	0.047	0.040	0.039	0.034	0.030	0.006
2002	87.4*	0	0.065	0.044	0.042	0.036	0.030	0.006
2003	94.5	0	0.053	0.036	0.033	0.030	0.028	0.006
2004	97.8	0	0.045	0.036	0.036	0.030	0.027	0.006
2005	95.3	0	0.034	0.033	0.030	0.028	0.026	0.006
2006	99.5	0	0.044	0.035	0.033	0.028	0.027	0.008
2007	94.2*	0	0.063	0.035	0.033	0.030	0.027	0.006

*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 2007

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)	Annual average (ppm)
1995	91.2*	0	0.038	0.037	0.035	0.031	0.028	0.009
1996	98.4	0	0.055	0.050	0.044	0.037	0.033	0.009
1997	96.4	0	0.046	0.042	0.040	0.036	0.030	0.009
1998	96.4	0	0.048	0.041	0.039	0.034	0.030	0.009
1999	98.4	0	0.046	0.039	0.038	0.032	0.029	0.008
2000	99.2	0	0.042	0.040	0.038	0.034	0.031	0.008
2001	100.0	0	0.045	0.037	0.036	0.034	0.031	0.009
2002	88.8*	0	0.062	0.057	0.043	0.036	0.033	0.010
2003	94.0	0	0.046	0.039	0.037	0.033	0.029	0.009
2004	100.0	0	0.054	0.047	0.038	0.034	0.030	0.009
2005	100.0	0	0.055	0.046	0.038	0.032	0.028	0.008
2006	100.0	0	0.050	0.043	0.041	0.035	0.032	0.012
2007	96.2	0	0.039	0.036	0.035	0.031	0.029	0.008

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

Table 31: Daily peak 1-hour nitrogen dioxide summary 1980 to 2007

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)	Annual average (ppm)
1980	97.3	0	0.070	0.065	0.058	0.043	0.038	0.011
1981	78.9*	0	0.070	0.060	0.051	0.041	0.037	0.010
1982	97.8	0	0.073	0.058	0.054	0.048	0.040	0.010
1983	95.6	0	0.056	0.050	0.042	0.033	0.030	0.006
1984	83.3*	0	0.076	0.061	0.056	0.048	0.041	0.007
1985	91.2	0	0.048	0.044	0.039	0.035	0.031	0.008
1986	83.6*	2	0.160	0.099	0.069	0.056	0.045	0.012
1987	92.1	0	0.089	0.078	0.067	0.060	0.052	0.015
1988	*60.1**	*0*	*0.114*	*0.083*	*0.077*	*0.066*	*0.055*	*0.015*
1989	84.4*	0	0.073	0.069	0.061	0.054	0.047	0.016
1990	75.3*	0	0.079	0.070	0.064	0.053	0.046	0.016
1991	89.0	0	0.113	0.085	0.071	0.061	0.052	0.015
1992	77.9*	2	0.157	0.072	0.065	0.052	0.042	0.013
1993	89.6	0	0.086	0.066	0.058	0.047	0.040	0.013
1994	91.8	0	0.096	0.062	0.057	0.051	0.045	0.012
1995	79.5*	0	0.066	0.050	0.048	0.040	0.036	0.010
1996	90.4*	0	0.058	0.055	0.044	0.040	0.036	0.010
1997	95.6	0	0.061	0.043	0.042	0.039	0.033	0.010
1998	96.2	0	0.056	0.046	0.041	0.038	0.033	0.009
1999	91.2*	0	0.054	0.044	0.042	0.034	0.029	0.009
2000	96.7	0	0.059	0.046	0.043	0.037	0.032	0.009
2001	98.4	0	0.049	0.042	0.041	0.035	0.032	0.009
2002	98.4	0	0.051	0.046	0.041	0.037	0.033	0.009
2003	97.0	0	0.050	0.039	0.038	0.033	0.030	0.009
2004	95.6	0	0.049	0.047	0.043	0.037	0.033	0.009
2005	98.6	0	0.046	0.042	0.041	0.036	0.031	0.009
2006	96.4	0	0.046	0.039	0.035	0.031	0.027	0.011
2007	100.0	0	0.044	0.041	0.040	0.035	0.031	0.008

*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 nitrogen dioxide summary 1994 to 2007

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)	Annual average (ppm)
1994	81.6*	0	0.049	0.047	0.044	0.038	0.028	0.005
1995	91.8	0	0.038	0.030	0.028	0.025	0.022	0.005
1996	84.2*	0	0.045	0.039	0.035	0.032	0.029	0.006
1997	*65.8**	*0*	*0.031*	*0.030*	*0.029*	*0.022*	*0.017*	*0.003*
1998	*72.9**	*0*	*0.022*	*0.020*	*0.018*	*0.015*	*0.012*	*0.002*
1999	88.8*	0	0.034	0.029	0.029	0.025	0.021	0.003
2000	97.8	0	0.031	0.025	0.024	0.022	0.019	0.003
2001	96.4	0	0.048	0.033	0.031	0.026	0.023	0.004
2002	98.4	0	0.036	0.031	0.029	0.026	0.021	0.004
2003	95.3	0	0.035	0.030	0.027	0.024	0.022	0.004
2004	100.0	0	0.042	0.030	0.029	0.026	0.023	0.004
2005	99.7	0	0.035	0.030	0.028	0.024	0.022	0.004
2006	100.0	0	0.034	0.027	0.027	0.024	0.021	0.003
2007	98.4	0	0.035	0.030	0.029	0.027	0.024	0.005

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

Table 33: Daily peak 1-hour ozone summary 1995 to 2007

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
2006	99.5	0	0.064	0.056	0.052	0.047	0.042
2007	99.5	0	0.086	0.056	0.054	0.047	0.042

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

Table 34: Daily peak 1-hour ozone summary 1980 to 2007

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
2006	97.5	0	0.079	0.066	0.063	0.055	0.048
2007	95.6	0	0.076	0.070	0.059	0.052	0.049

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

Table 35: Daily peak 1-hour ozone summary 1994 to 2007

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
2006	100.0	0	0.077	0.069	0.065	0.057	0.050
2007	100.0	0	0.069	0.062	0.060	0.055	0.050

Table 36: Daily peak 4-hour ozone summary 1995 to 2007

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
2006	99.5	0	0.060	0.055	0.048	0.044	0.039
2007	99.7	0	0.070	0.052	0.050	0.044	0.040

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

Table 37: Daily peak 4-hour ozone summary 1980 to 2007

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
2006	97.5	0	0.068	0.056	0.055	0.049	0.043
2007	95.9	0	0.067	0.058	0.053	0.048	0.043

*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 4-hour ozone summary 1994 to 2007

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
2006	100.0	0	0.070	0.059	0.056	0.050	0.044
2007	100.0	0	0.062	0.056	0.054	0.049	0.045

Table 39: Daily peak 1-hour sulfur dioxide summary 1993 to 2007

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)	Annual average (ppm)
1993	88.2*	0	0.049	0.030	0.024	0.018	0.014	0.002
1994	98.9	0	0.033	0.027	0.025	0.021	0.017	0.003
1995	*59.5**	*0*	*0.041*	*0.029*	*0.027*	*0.020*	*0.014*	*0.002*
1996	88.3*	0	0.047	0.037	0.027	0.023	0.017	0.002
1997	97.0	0	0.047	0.040	0.035	0.023	0.019	0.002
1998	95.9	0	0.090	0.037	0.033	0.024	0.019	0.002
1999	96.4	0	0.070	0.035	0.033	0.028	0.021	0.002
2000	89.9	0	0.081	0.049	0.036	0.027	0.022	0.002
2001	99.5	0	0.053	0.048	0.043	0.029	0.023	0.001
2002	97.0	0	0.057	0.035	0.033	0.025	0.018	0.001
2003	96.4	0	0.046	0.031	0.030	0.023	0.017	0.001
2004	99.5	0	0.063	0.036	0.031	0.021	0.016	0.001
2005	100.0	0	0.034	0.028	0.024	0.020	0.014	0.001
2006	100.0	0	0.040	0.037	0.027	0.023	0.018	0.001
2007	100.0	0	0.026	0.024	0.022	0.018	0.014	0.001

*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 1991 to 2007

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)	Annual average (ppm)
1991	92.6	0	0.011	0.011	0.009	0.008	0.006	0.002
1992	94.3	0	0.052	0.039	0.029	0.020	0.015	0.003
1993	98.3	0	0.075	0.059	0.050	0.039	0.032	0.004
1994	97.0	0	0.070	0.042	0.040	0.031	0.024	0.003
1995	96.7	0	0.168	0.083	0.065	0.047	0.035	0.004
1996	99.2	0	0.083	0.053	0.042	0.026	0.018	0.002
1997	98.9	0	0.049	0.029	0.023	0.014	0.010	0.001
1998	97.5	0	0.076	0.050	0.042	0.027	0.020	0.001
1999	94.2	0	0.051	0.042	0.039	0.027	0.022	0.002
2000	84.7*	0	0.092	0.071	0.045	0.034	0.024	0.001
2001	98.1	0	0.068	0.046	0.035	0.023	0.018	0.001
2002	94.5	0	0.123	0.040	0.031	0.025	0.020	0.001
2003	93.2	0	0.112	0.058	0.041	0.025	0.019	0.001
2004	96.4	0	0.064	0.040	0.032	0.022	0.017	0.001
2005	99.7	0	0.084	0.063	0.053	0.032	0.027	0.002
2006	100.0	0	0.093	0.071	0.064	0.049	0.034	0.002
2007	98.4	0	0.075	0.069	0.061	0.044	0.035	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 41: Daily peak 1-hour sulfur dioxide summary 1983 to 2007

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)	Annual average (ppm)
1983	*67.4**	*25*	*0.725*	*0.515*	*0.430*	*0.270*	*0.200*	*0.021*
1984	93.7	31	1.155	0.555	0.515	0.330	0.185	0.017
1985	97.3	7	1.080	0.325	0.210	0.100	0.055	0.016
1986	88.5	50	1.406	1.255	0.788	0.577	0.296	0.031
1987	98.9	51	1.755	1.016	0.853	0.546	0.324	0.022
1988	91.0*	31	0.798	0.682	0.562	0.342	0.159	0.017
1989	85.2	41	0.957	0.585	0.503	0.348	0.241	0.020
1990	*44.7**	*6*	*0.577*	*0.493*	*0.222*	*0.145*	*0.091*	*0.030*
1991	*54.8**	*28*	*0.673*	*0.638*	*0.440*	*0.294*	*0.215*	*0.018*
1992	88.5*	25	0.540	0.457	0.406	0.286	0.170	0.012
1993	95.6	24	0.718	0.434	0.403	0.282	0.134	0.015
1994	91.5	20	0.688	0.483	0.343	0.250	0.135	0.019
1995	98.9	11	0.443	0.254	0.239	0.184	0.109	0.005
1996	98.6	16	0.598	0.409	0.285	0.198	0.131	0.005
1997	98.9	7	0.300	0.256	0.216	0.128	0.083	0.003
1998	*48.8**	*16*	*0.693*	*0.548*	*0.368*	*0.265*	*0.190*	*0.005*
1999	90.4*	17	0.675	0.366	0.269	0.202	0.141	0.004
2000	96.4	31	0.584	0.373	0.357	0.250	0.191	0.006
2001	98.9	41	0.581	0.438	0.422	0.295	0.222	0.006
2002	91.2	49	1.254	0.551	0.526	0.385	0.272	0.009
2003	98.9	42	0.658	0.503	0.493	0.312	0.217	0.007
2004	97.5	36	0.888	0.665	0.444	0.302	0.207	0.007
2005	93.7*	49	0.964	0.663	0.512	0.395	0.271	0.009
2006	97.0	25	0.567	0.398	0.356	0.246	0.176	0.005
2007	96.7	31	0.608	0.408	0.375	0.282	0.185	0.007

*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 1993 to 2007

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)	Annual average (ppm)
1993	88.2*	0	0.006	0.005	0.005	0.004	0.003	0.002
1994	98.9	0	0.008	0.007	0.006	0.006	0.005	0.003
1995	*59.5**	*0*	*0.009*	*0.008*	*0.006*	*0.005*	*0.004*	*0.002*
1996	88.3*	0	0.010	0.005	0.005	0.004	0.004	0.002
1997	97.0	0	0.009	0.006	0.005	0.004	0.003	0.002
1998	95.9	0	0.011	0.007	0.006	0.004	0.004	0.002
1999	96.4	0	0.009	0.007	0.007	0.005	0.004	0.002
2000	89.9	0	0.013	0.012	0.008	0.006	0.005	0.002
2001	99.5	0	0.014	0.007	0.006	0.004	0.003	0.001
2002	97.0	0	0.006	0.006	0.005	0.003	0.003	0.001
2003	96.4	0	0.006	0.005	0.004	0.003	0.002	0.001
2004	99.5	0	0.007	0.006	0.005	0.003	0.003	0.001
2005	100.0	0	0.006	0.004	0.004	0.002	0.002	0.001
2006	99.7	0	0.007	0.006	0.004	0.004	0.003	0.001
2007	99.5	0	0.006	0.004	0.004	0.003	0.002	0.001

*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 1991 to 2007

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)	Annual average (ppm)
1991	92.6	0	0.007	0.006	0.006	0.004	0.004	0.002
1992	94.3	0	0.012	0.011	0.010	0.009	0.008	0.003
1993	98.3	0	0.014	0.010	0.010	0.008	0.007	0.004
1994	97.0	0	0.013	0.007	0.007	0.006	0.005	0.003
1995	96.7	0	0.017	0.014	0.012	0.008	0.007	0.004
1996	99.2	0	0.010	0.007	0.006	0.005	0.004	0.002
1997	98.9	0	0.007	0.004	0.003	0.002	0.002	0.001
1998	97.5	0	0.012	0.010	0.007	0.005	0.003	0.001
1999	94.2	0	0.009	0.008	0.006	0.005	0.004	0.002
2000	84.7*	0	0.022	0.008	0.006	0.004	0.003	0.001
2001	98.1	0	0.006	0.005	0.004	0.003	0.002	0.001
2002	94.5	0	0.029	0.029	0.006	0.004	0.003	0.001
2003	93.2	0	0.013	0.011	0.007	0.005	0.003	0.001
2004	96.4	0	0.007	0.006	0.006	0.004	0.003	0.001
2005	98.9	0	0.011	0.009	0.006	0.004	0.004	0.002
2006	97.5	0	0.019	0.014	0.011	0.008	0.006	0.003
2007	97.5	0	0.021	0.012	0.010	0.007	0.005	0.002

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

Table 44: Daily 24-hour sulfur dioxide summary 1984 to 2007

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)	Annual average (ppm)
1984	93.7	3	0.094	0.087	0.071	0.053	0.033	0.017
1985	97.3	1	0.111	0.050	0.042	0.030	0.024	0.016
1986	88.5	11	0.145	0.123	0.101	0.071	0.052	0.031
1987	98.9	12	0.158	0.110	0.099	0.060	0.044	0.022
1988	91.0*	3	0.123	0.091	0.064	0.041	0.032	0.017
1989	85.2	1	0.100	0.066	0.062	0.048	0.035	0.020
1990	*44.7**	*1*	*0.088*	*0.078*	*0.072*	*0.052*	*0.046*	*0.030*
1991	*54.8**	*3*	*0.117*	*0.100*	*0.073*	*0.053*	*0.038*	*0.018*
1992	88.5*	0	0.064	0.056	0.052	0.033	0.025	0.012
1993	95.6	0	0.064	0.052	0.046	0.040	0.027	0.015
1994	91.5	2	0.085	0.059	0.054	0.045	0.040	0.019
1995	98.9	0	0.049	0.036	0.028	0.018	0.012	0.005
1996	98.6	0	0.049	0.043	0.040	0.024	0.015	0.005
1997	98.9	0	0.034	0.028	0.022	0.016	0.010	0.003
1998	*48.8**	*0*	*0.055*	*0.041*	*0.037*	*0.029*	*0.019*	*0.005*
1999	90.4*	0	0.049	0.036	0.032	0.024	0.015	0.004
2000	96.4	0	0.078	0.070	0.055	0.032	0.019	0.006
2001	98.9	0	0.075	0.052	0.045	0.033	0.021	0.006
2002	91.2	1	0.081	0.057	0.055	0.043	0.033	0.009
2003	98.9	2	0.093	0.067	0.057	0.036	0.022	0.007
2004	97.5	1	0.100	0.069	0.050	0.034	0.017	0.007
2005	91.8*	2	0.091	0.069	0.060	0.044	0.032	0.009
2006	93.7	0	0.065	0.054	0.045	0.032	0.018	0.005
2007	94.5	1	0.199	0.060	0.046	0.036	0.023	0.007

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

Table 45: Daily 24-hour PM_{10} summary 1997 to 2007

Trend station/region: Rocklea, south-east Queensland

AAQ NEPM standard
50 µg/m^3 (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
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
2006	96.2	0	45.5	32.6	31.1	27.0	23.8
2007	99.2	1	53.4	41.4	38.9	32.1	26.7

Table 46: Daily 24-hour PM_{10} summary 1999 to 2007

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

AAQ NEPM standard
50 µg/m^3 (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
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
2006	100.0	0	35.7	29.5	28.6	26.0	22.5
2007	99.2	0	44.6	39.6	36.7	28.3	23.4

Table 47: Daily 24-hour PM_{10} summary 2001 to 2007

Trend station/region: South Gladstone, Gladstone

AAQ NEPM standard
50 µg/m^3 (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
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
2006	98.4	1	54.6	37.5	34.3	28.6	23.7
2007	96.7	0	38.8	29.5	28.4	25.4	22.9

Table 48: Daily 24-hour $PM_{2.5}$ summary 1998 to 2007

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

AAQ NEPM advisory standard
25 µg/m^3 (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)	Annual average (µg/m^3)
1998	80.8*	0	16.1	11.1	9.2	7.7	6.0	3.5
1999	88.8*	0	14.5	13.3	12.4	10.3	8.3	5.0
2000	95.6	3	37.4	20.2	17.7	13.3	10.9	5.8
2001	98.6	3	95.4	18.4	17.1	12.3	9.2	5.5
2002	96.4	3	45.3	22.0	17.1	12.8	10.9	6.1
2003	98.6	1	33.1	14.7	13.3	10.2	8.1	4.6
2004	94.3	5	29.7	28.7	22.5	17.2	11.3	6.2
2005	90.4*	0	15.3	13.0	10.9	9.2	8.0	4.5
2006	96.2	0	14.1	13.0	10.6	8.4	7.0	4.2
2007	100.0	0	19.3	16.4	13.5	10.6	8.2	4.3

[†]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: Daily 24-hour $PM_{2.5}$ summary 1999 to 2007

Trend station/region: Springwood, south-east Queensland[†]

AAQ NEPM advisory standard
25 µg/m^3 (24-hour average)

Year	Data availability (%)	No. of exceedences (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)	Annual average (µg/m^3)
1999	82.7*	0	22.3	12.9	11.8	8.7	7.1	4.3
2000	96.7	6	35.4	28.9	23.6	17.3	13.2	6.4
2001	97.0	0	19.4	18.0	16.2	11.8	9.1	5.3
2002	95.9	5	38.9	28.4	20.1	14.9	11.7	6.2
2003	98.4	0	20.5	16.0	15.1	10.7	8.8	5.2
2004	98.4	0	21.7	16.8	15.4	11.6	9.5	5.4
2005	96.4	0	15.2	13.9	12.3	10.2	8.2	4.6
2006	94.5	1	25.5	21.4	15.3	9.5	8.0	4.9
2007	98.4	0	17.9	12.8	12.1	9.2	7.8	4.3

[†]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 50: Annual lead summary 1980 to 2002

Trend station/region: Woolloongabba, south-east Queensland

AAQ NEPM standard
0.5 µg/m^3 (annual average)

Year	Data availability (%)	Annual average (µg/m^3)
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.

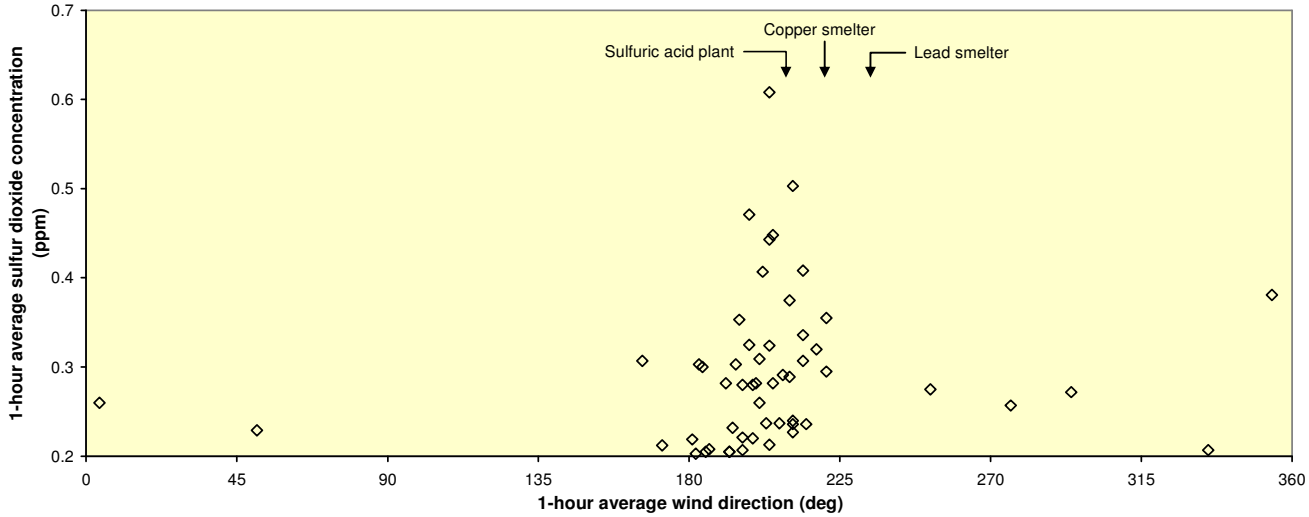
Appendix – Description of 2007 exceedence events

Sulfur dioxide exceedences at Menzies in 2007

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 were only controlled to meet *Mount Isa Mines Agreement Act 1985* air quality limits during 2007, sulfur dioxide levels exceeded the more stringent Air NEPM 1-hour and 24-hour standards on occasions. Amendments were made to the *Environmental Protection Act 1994* (EP Act) in May 2008 to allow all Special Agreement Act mines to transition to the contemporary environmental controls under the EP Act. Under the transitional arrangements, it is intended that smelter operations will progressively move towards compliance with the Air NEPM standards within three years.

The smelters and sulfuric acid manufacturing plant are situated to the south-southwest of the Menzies monitoring site. The relationship between one-hour average wind direction and sulfur dioxide concentrations greater than 0.200ppm (figure 2) demonstrates that exceedences are highly correlated with winds blowing from these plants towards the Menzies site.

Figure 2: Relationship between 1-hour average wind direction and sulfur dioxide concentrations at the Menzies site during 2007.



PM_{10} exceedence at Rocklea on 5 July 2007

On 5 July strong gusty westerly winds accompanying the passage of a surface trough created elevated levels of wind-blown dust across south-east Queensland and led to an exceedence of the Air NEPM 24-hour PM_{10} standard at the Rocklea air monitoring site.

The fact that $PM_{2.5}$ and Bsp (nephelometer) measurements at Rocklea showed little correlation with the PM_{10} measurements (figure 3) indicates a high proportion of coarse particles, consistent with wind blown dust particles.

Figure 3: Particle concentrations at the Rocklea site on 5 July 2007.

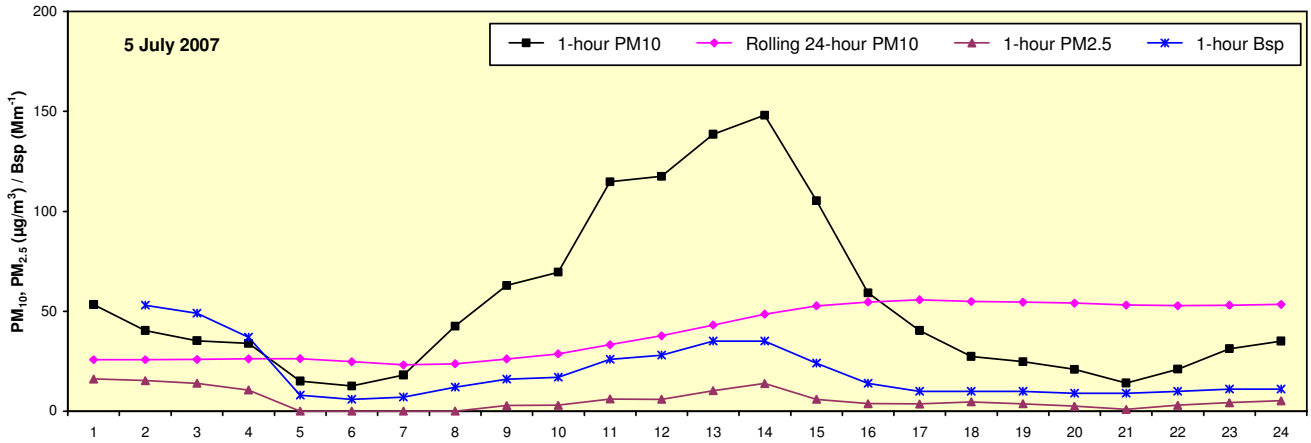
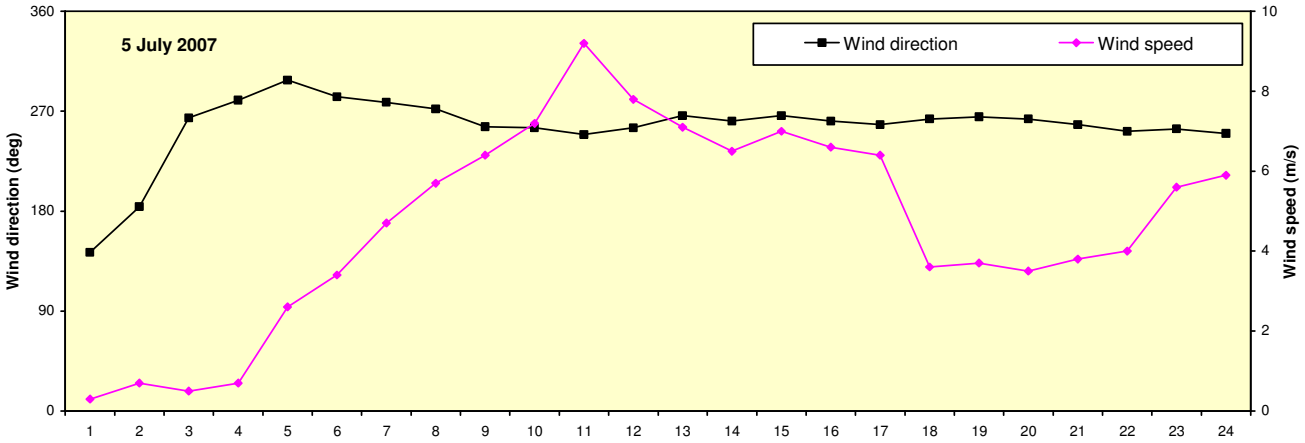


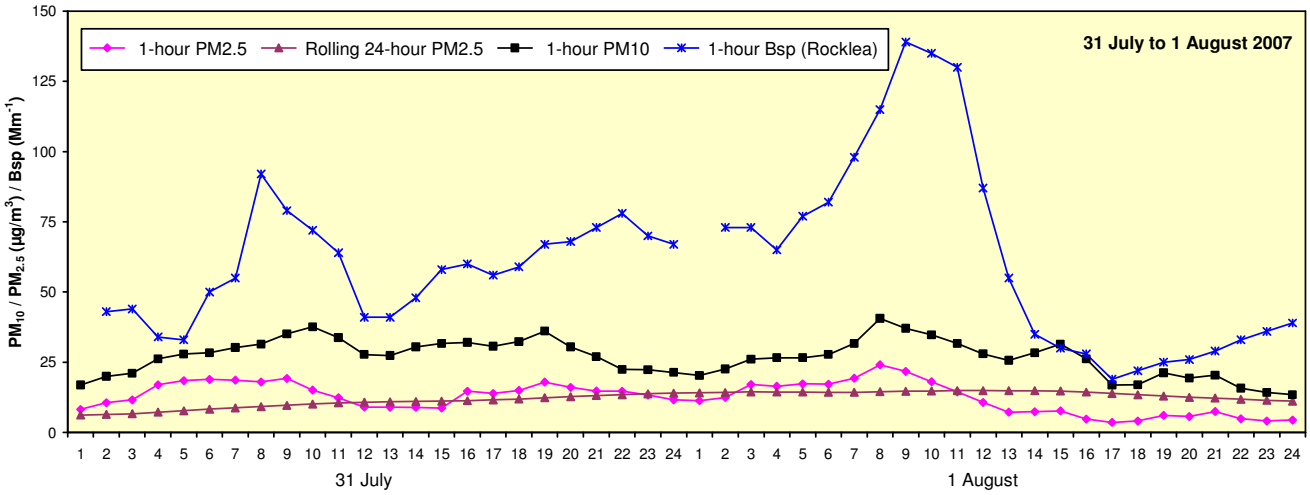
Figure 4: Wind direction and speed at the Rocklea site on 5 July 2007.



$PM_{2.5}$ exceedence at Springwood on 1 August 2007

Smoke from both bushfires and hazard reduction burns, in combination with stable atmospheric conditions, led to episodes of elevated particle levels in south-east Queensland in late July and early August 2007. The reference $PM_{2.5}$ sampler at the Springwood monitoring site recorded an exceedence of the advisory $PM_{2.5}$ 24-hour standard on 1 August as a result of these smoke particles. Although the TEOM $PM_{2.5}$ sampler at the Springwood monitoring site did not replicate this exceedence (highest rolling 24-hour average TEOM $PM_{2.5}$ concentration was 15.0µg/m^3), figure 5 shows that $PM_{2.5}$ particles made up approximately 60 percent of the PM_{10} particle fraction on this day at the Springwood site, consistent with the presence of a significant proportion of smaller particles from combustion sources. Corresponding Bsp (nephelometer) measurements at the Rocklea monitoring site also show elevated levels of fine particles on this day (figure 5).

Figure 5: Particle concentrations at the Springwood site from 31 July to 1 August 2007.



PM_{10} exceedences at Mackay on 6 August and 18 September 2007

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. With increasing amounts of cane being harvested green (currently over 98 percent of the total crop is green harvested), occurrences of agricultural smoke impacts in Mackay have decreased in recent years.

However, changes in activities at commercial premises in the immediate vicinity of the West Mackay monitoring site (principally movement of soil stockpiles) have seen an increase in occasional but significant episodes of local dust generation impacting on the monitoring site. Elevated dust concentrations due to these activities are not representative of general population exposure in Mackay as a whole. These localised dust-generating activities were responsible for exceedences of the PM_{10} 24-hour standard at the West Mackay site on 6 August and 18 September 2007. Figures 6 and 7 shows that PM_{10} particles on 6 August and 18 September were elevated from approximately 6:00am to 4:00pm, which corresponds to the hours of work at nearby premises. Corresponding low Bsp measurements during these times point to larger dust particles, rather than smaller smoke particles from agricultural burning, being the cause of these exceedences.

Figure 6: Particle concentrations at the West Mackay site on 6 August 2007.

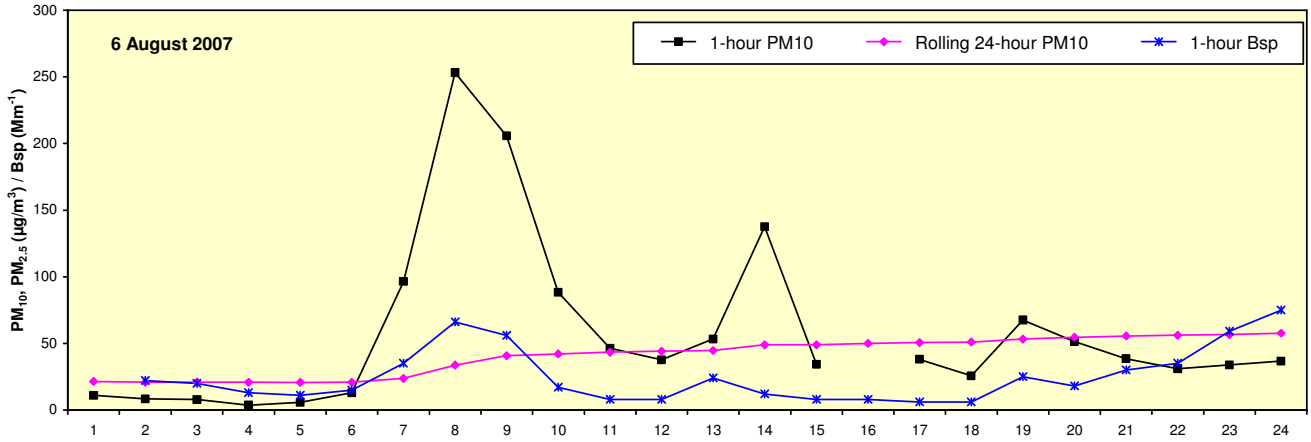
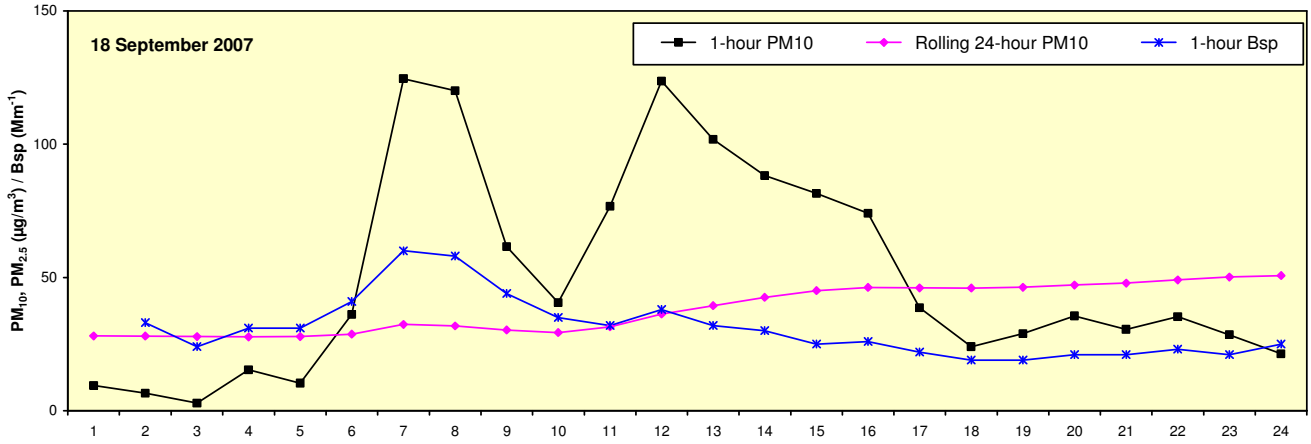


Figure 7: Particle concentrations at the West Mackay site on 18 September 2007.



PM_{10} exceedence at Toowoomba on 20 September 2007

Strong gusty westerly winds accompanying the passage of a surface trough created elevated levels of wind-blown dust across southern Queensland on 20 September. Passage of the trough through the Toowoomba region in the mid-afternoon was accompanied by high PM_{10} concentrations at the North Toowoomba monitoring site (figure 8), leading to an exceedence of the Air NEPM PM_{10} standard.

Corresponding low $PM_{2.5}$ and Bsp measurements point to coarse wind blown dust particles being responsible for the elevated PM_{10} measurements at the North Toowoomba site on 20 September.

Figure 8: Particle concentrations at the North Toowoomba site on 20 September 2007.

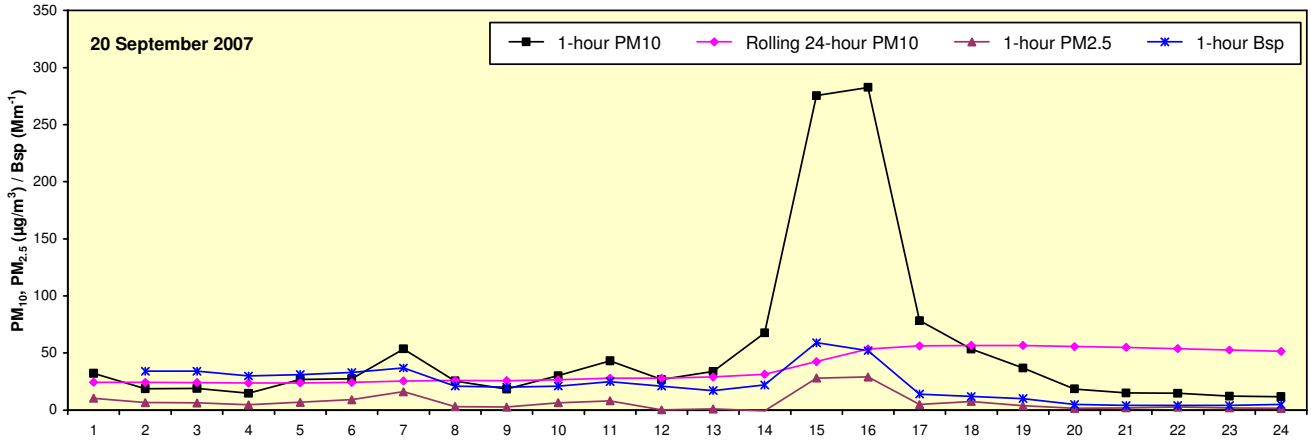


Figure 9: Wind direction and speed at the North Toowoomba site on 20 September 2007.