QUEENSLAND

2002
AIR MONITORING REPORT

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

June 2003

Queensland Government
Environmental Protection Agency

SUMMARY

2002 monitoring results for Queensland indicated that:

?? Exceedences of the AAQ NEPM standards occurred for:
  - o 1-hour and 4-hour ozone at Rocklea and Flinders View in south-east Queensland due to a combination of bushfire emissions and conducive meteorology;
  - o 1-hour and 24-hour sulfur dioxide at Menzies in Mount Isa due to industrial emissions; and
  - o 24-hour PM_{10} at Mountain Creek, Rocklea, Springwood, Hellensvale and Flinders View in south-east Queensland, South Gladstone and at West Mackay due to windblown dust and bushfire smoke.

?? The AAQ NEPM 2008 goal was met in all regions during 2002, with the exception of:
  - o 1-hour ozone at Rocklea in south-east Queensland;
  - o 1-hour sulfur dioxide at Menzies in Mount Isa; and
  - o 24-hour PM_{10} at Mountain Creek, Rocklea, Springwood and Flinders View in south-east Queensland and at West Mackay.

?? Compliance with the standards and the 2008 goal could not be demonstrated at some monitoring stations because data availability was below the level required to make a valid assessment.

Implementation of additional monitoring in regional centres proceeded in accordance with the timeframes contained in the Queensland AAQ NEPM ambient air monitoring plan, with the exception of delays to the commencement of monitoring in Townsville and Toowoomba due to siting issues.

The EPA's quality assurance system for ambient air quality monitoring and data validation procedures was assessed by NATA in March 2003. The EPA is currently addressing the conditions raised in the assessment report.

Introduction

Under Clause 18 of the National Environment Protection Measure for Ambient Air Quality, 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 the 2002 year 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 2002

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)

Section A – Monitoring Summary

Queensland's ambient air monitoring plan (available from *www.epa.qld.gov.au/environment/science/air/airquality*) 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 2002 follow.

Current AAQ NEPM Monitoring Stations

During 2002 monitoring was conducted in five of the ten regions identified in the Queensland monitoring plan – south-east Queensland (consisting of four sub-regions), Gladstone, Mackay, Townsville and Mount Isa.

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 (typically operational for one year) to assess the need for ongoing monitoring in the region to measure achievement against the Goal of the AAQ NEPM

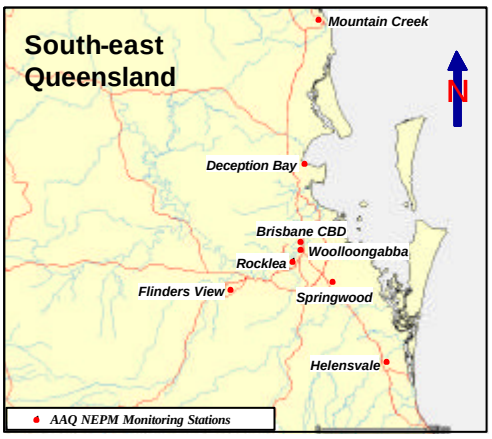
Sites are further characterised using the population coverage descriptors contained in the National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 3, "Monitoring Strategy" (available from *www.ephc.gov.au*):

- 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.

South-east Queensland

Monitoring stations located in south-east Queensland in 2002 include:



North Coast sub-region:
Site: Mountain Creek
Station type: PMS - GRUB
Established: July 2001
Pollutants monitored: ozone (from February 2002), nitrogen dioxide (from February 2002) and PM_{10}
Monitoring techniques: AS3580.6.1-1990 (ozone), AS3580.5.1-1993 (nitrogen dioxide), AS3580.9.8-2001 (PM_{10})
Exposed population: medium
AS2922 siting criteria: complies with all criteria
Pollutant sources: major roads, forestry/agricultural burning

Brisbane sub-region:
Site: Deception Bay
Station type: Trend - GRUB
Established: June 1994
Pollutants monitored: ozone and nitrogen dioxide
Monitoring techniques: AS3580.6.1-1990 (ozone), AS3580.5.1-1993 (nitrogen dioxide)
Exposed population: medium
AS2922 siting criteria: complies with all criteria except distance to trees (in SW direction)
Pollutant sources: major roads

Site: Brisbane CBD
Station type: Trend - GRUB
Established: April 1998
Pollutants monitored: carbon monoxide
Monitoring techniques: AS3580.7.1-1992
Exposed population: high
AS2922 siting criteria: complies with all criteria except height above ground (10 metres) and clear sky angle (<120^{o} due to inlet being mounted on the side of building)
Pollutant sources: major roads

Site: Woolloongabba
Station type: PMS - GRUB
Established: August 1976
Pollutants monitored: lead
Monitoring techniques: AS2724.3-1984 (TSP), AS2800-1985 (lead)
Exposed population: high
AS2922 siting criteria: complies with all criteria except distance from road (5 metres to nearest traffic lane)
Pollutant sources: major roads

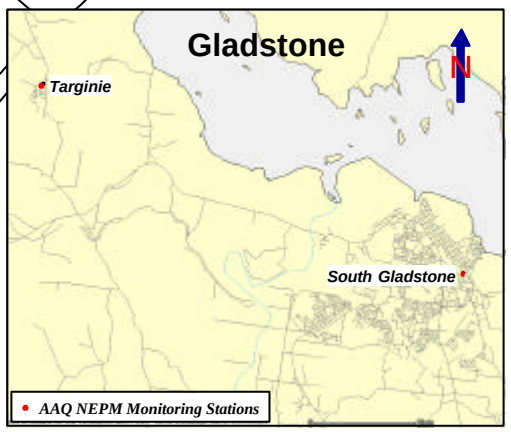
Site: Rocklea
Station type: Trend - GRUB
Established: April 1994
Pollutants monitored: ozone, nitrogen dioxide and PM_{10}
Monitoring techniques: AS3580.6.1-1990 (ozone), AS3580.5.1-1993 (nitrogen dioxide), AS3580.9.8-2001 (PM_{10})
Exposed population: high
AS2922 siting criteria: complies with all criteria
Pollutant sources: major roads

Site: Springwood
Station type: PMS – population-average
Established: March 1999
Pollutants monitored: ozone, nitrogen dioxide, sulfur dioxide and PM_{10}
Monitoring techniques: differential optical absorption spectroscopy (DOAS) (ozone, nitrogen dioxide, sulfur dioxide), AS3580.9.8-2001 (PM_{10})
Exposed population: high
AS2922 siting criteria: complies with all criteria
Pollutant sources: major roads

Gold Coast sub-region:
Site: Helensvale
Station type: PMS - GRUB
Established: April 1998 (closed October 2002)
Pollutants monitored: ozone, nitrogen dioxide and PM_{10}
Monitoring techniques: AS3580.6.1-1990 (ozone), AS3580.5.1-1993 (nitrogen dioxide), AS3580.9.8-2001 (PM_{10})
Exposed population: high
AS2922 siting criteria: complies with all criteria except unrestricted air flow (situated close to another building of similar height)
Pollutant sources: major roads

Ipswich sub-region:
Site: Flinders View
Station type: Trend - GRUB
Established: January 1993
Pollutants monitored: ozone, nitrogen dioxide, sulfur dioxide and PM_{10}
Monitoring techniques: AS3580.6.1-1990 (ozone), AS3580.5.1-1993 (nitrogen dioxide), AS3580.4.1-1990 (sulfur dioxide), AS3580.9.8-2001 (PM_{10})
Exposed population: medium
AS2922 siting criteria: complies with all criteria except distance to trees (trees pruned to below inlet height)
Pollutant sources: major roads, industry (power generation)

<u>Gladstone</u>
Monitoring stations located in Gladstone in 2002 include:

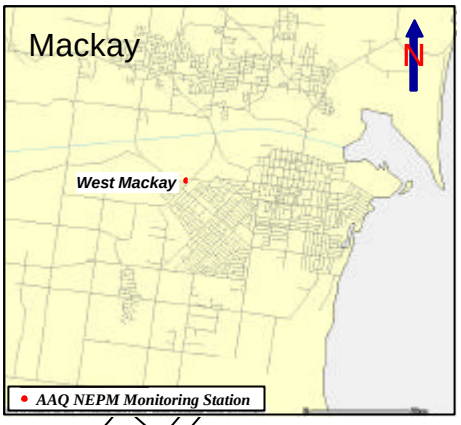


Site: South Gladstone
Station type: Trend - GRUB
Established: July 2001
Pollutants monitored: nitrogen dioxide, sulfur dioxide and PM_{10}
Monitoring techniques: AS3580.5.1-1993 (nitrogen dioxide), AS3580.4.1-1990 (sulfur dioxide), AS3580.9.8-2001 (PM_{10})
Exposed population: medium
AS2922 siting criteria: complies with all criteria except distance to trees (in NW direction)
Pollutant sources: industry (metals processing, power generation)

Site: Targinie
Station type: Campaign - GRUB
Established: December 2000
Pollutants monitored: ozone
Monitoring techniques: differential optical absorption spectroscopy (DOAS)
Exposed population: low
AS2922 siting criteria: complies with all criteria except distance to trees (along DOAS light path)
Pollutant sources: industry (metals processing, petroleum refining, cement manufacture)

Mackay

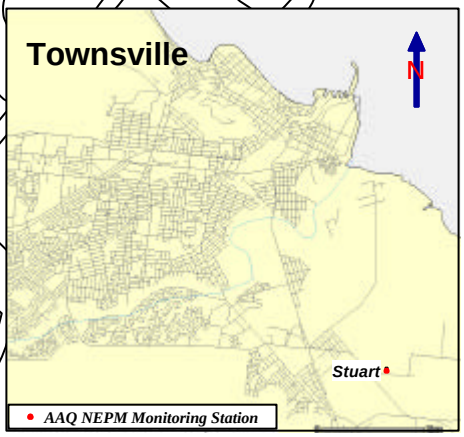
One monitoring station was located in Mackay in 2002:



Site: West Mackay
Station type: PMS - GRUB
Established: September 1997
Pollutants monitored: PM_{10}.
Monitoring techniques: AS3580.9.8-2001 (PM_{10})
Exposed population: medium
AS2922 siting criteria: complies with all criteria
Pollutant sources: agricultural burning

Townsville

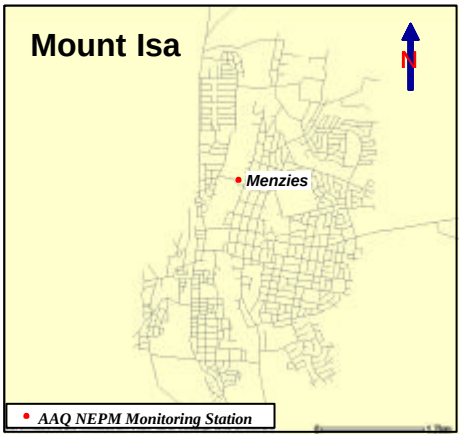
One monitoring station was located in Townsville in 2002:



Site: Stuart
Station type: Campaign - GRUB
Established: September 2001
Pollutants monitored: sulfur dioxide
Monitoring techniques: AS3580.4.1-1990
Exposed population: low
AS2922 siting criteria: complies with all criteria
Pollutant sources: industry (metals processing)

Mount Isa

One monitoring station was located in Mount Isa:



Site: Menzies
Station type: Trend – GRUB
Established: January 1979
Pollutants monitored: sulfur dioxide
Monitoring techniques: AS3580.4.1-1990
Exposed population: low
AS2922 siting criteria: complies with all criteria except distance to trees (trees pruned to below inlet height)
Pollutant sources: industry (metals smelting, sulfuric acid manufacture)

Implementation Activities

The EPA has continued to upgrade its ambient air monitoring network in line with the implementation schedule set out in the Queensland air monitoring plan. Expansion activities during 2002 included commencement of ozone and nitrogen dioxide monitoring at the North Coast station in south-east Queensland (PM_{10} monitoring commenced at the site in July 2001). The station is located at Mountain Creek, a residential suburb bordered on two sides by a major traffic corridor. The site is also in close proximity to sugarcane farms and forestry reserves which are subject to regular burning activities.

The EPA has completed the development of a quality assurance system for its ambient air quality monitoring and data validation procedures. The system was assessed by NATA in March 2003 and the EPA is currently addressing a number of conditions raised in the assessment report. NATA have indicated that accreditation will be recommended once all these conditions are satisfactorily addressed.

Variations to the approved monitoring plan for Queensland

Difficulties in identifying and obtaining siting approvals has delayed commencement of monitoring in Townsville (for ozone, nitrogen dioxide and PM_{10} only) and Toowoomba. Site infrastructure works for the performance monitoring station in Toowoomba are nearing completion and monitoring will commence in July 2003. It is anticipated that monitoring will be in place in Townsville for the 2004 year.

Repeated vandalism necessitated the closure of the Northern Gold Coast (Helensvale) station in south-east Queensland in October 2002. To date, the EPA has been unable to identify an alternative monitoring location within the Gold Coast sub-region that satisfies the requirements of the AAQ NEPM, but will endeavour to have a new station operating for the 2004 year.

Co-location of Australian Standard instrumentation to confirm the equivalence of ozone, nitrogen dioxide and sulfur dioxide measurements obtained from DOAS instrumentation at the Springwood site in south-east Queensland has yet to be undertaken. The results of this study will be applied to the DOAS ozone measurements obtained at Targinie in the Gladstone region.

Section B – Assessment of Compliance with Standards and 2008 Goal

This section provides details of the annual compliance assessment for January to December 2002. 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 at some monitoring stations, although available measurement data suggest that air quality at these stations would have complied.

Tables 1 to 6 summarise compliance of monitoring with the standards and 2008 goal for the six AAQ NEPM pollutants for 2002. 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 (National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, "Screening Procedures" (available from *www.ephc.gov.au*)) shows pollutant levels are reasonably expected to be consistently below the relevant standard.

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 15^{o}C to an increase of 40 percent at a temperature of 5^{o}C.

CARBON MONOXIDE

Table 1: 2002 compliance summary for CO 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* Brisbane CBD	31.6	73.7	88.5	99.8	73.6	0	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 = "met").

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

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. Peak carbon monoxide concentrations in the south-east Queensland region for the period 2000 to 2002 have been consistently less than 40% 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".

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

- Toowoomba

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

- Mount Isa

NITROGEN DIOXIDE

Table 2: 2002 compliance summary for NO_2 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	58.7	91.0	90.7	90.2	82.8	0	0.006	ND	ND
Brisbane sub-region									
Deception Bay	62.4	90.9	85.0	83.5	80.5	0	0.006	ND	ND
Rocklea	90.5	90.8	89.4	90.6	90.3	0	0.009	met	met
Springwood	96.2	98.4	97.6	93.7	96.4	0	0.008	met	met
Gold Coast sub-region									
Helensvale	86.8	90.6	90.9	3.4	80.6	0	0.009	ND	ND
Ipswich sub-region									
Flinders View	91.4	90.9	90.5	55.2	81.9	0	0.010	ND	ND
Gladstone									
South Gladstone	91.3	91.0	89.9	89.5	90.4	0	0.004	met	met

ND = "not demonstrated" due to insufficient data

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

?? Toowoomba
?? Townsville

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

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

OZONE

Table 3: 2002 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	58.5	91.2	90.9	90.3	82.8	0	0	ND	ND
Brisbane sub-region									
Deception Bay	64.2	91.0	85.0	90.9	82.9	0	0	ND	ND
Rocklea	90.6	91.0	89.4	90.8	90.4	2	1	not met	met
Springwood	96.5	98.1	97.2	81.4	93.3	0	0	met	met
Gold Coast sub-region									
Helensvale	86.7	90.8	90.9	6.5	81.0	0	0	ND	ND
Ipswich sub-region									
Flinders View	90.0	89.1	89.9	85.5	88.6	0	1	met	met
Gladstone									
Targinie	98.2	88.4	84.5	91.2	90.5	0	0	met	met

ND = "not demonstrated" due to insufficient data

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

?? Toowoomba
?? Townsville

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

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

SULFUR DIOXIDE

Table 4: 2002 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	96.5	98.3	98.4	96.4	97.4	0	0	0.001	met	met	met
Ipswich sub-region											
Flinders View	91.5	90.8	90.6	84.7	89.4	0	0	0.001	met	met	met
Gladstone											
South Gladstone	90.8	90.2	90.9	76.8	87.6	0	0	0.001	met	met	met
Townsville											
Stuart	94.9	95.6	95.0	95.8	95.3	0	0	0.000	met	met	met
Mount Isa											
Menzies	75.0	84.5	91.7	90.9	85.6	49	1	0.009	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 = "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, 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% 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 = "not demonstrated").

- Rockhampton

PARTICLES as PM_{10}

Table 5: 2002 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	89.7	100.0	65.2	97.8	88.1	8	not met
Brisbane sub-region							
Rocklea	100.0	100.0	97.8	98.9	99.2	7	not met
Springwood	95.4	97.7	100.0	92.1	96.3	7	not met
Gold Coast sub-region							
Helensvale	94.3	100.0	98.9	3.3	88.1	1	ND
Ipswich sub-region							
Flinders View	98.9	100.0	100.0	92.1	97.7	7	not met
Gladstone							
South Gladstone	98.9	100.0	98.9	94.4	98.0	5	met
Mackay							
West Mackay	98.9	96.6	100.0	98.9	98.6	6	not met

ND = "not demonstrated" due to insufficient data

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

?? Bundaberg
?? Cairns
?? Maryborough/Hervey Bay
?? Mount Isa
?? Rockhampton
?? Toowoomba
?? Townsville

LEAD

Table 6: 2002 compliance summary for Lead in Queensland

AAQ NEPM standard
0.50 µg/m^3 (1-year average)

Region/ Performance monitoring station	Data availability rates (% of days)					Annual mean (µg/m^3)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
South-east Queensland *Brisbane sub-region* Woolloongabba	100.0	100.0	93.8	93.3	96.7	0.02	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 = "met").

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

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. Peak lead concentrations in south-east Queensland are less than 40% of the AAQ NEPM standard (see above). On this basis, lead monitoring in other Queensland centres with lower population and traffic density (except Mount Isa) 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". Annual lead concentrations measured at the south-east Queensland performance monitoring station have been less than 10% of the AAQ NEPM standard for 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*), it can be concluded that compliance with the AAQ NEPM Standard and 2008 Goal has been achieved in south-east Queensland, and monitoring of lead will be discontinued.

Regions for which monitoring has not yet been carried out (i.e. performance = "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 the 2002 year. 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 7 to 9. Summary maxima statistics are provided in tables 10 to 16.

Exceedence summary

During 2002, exceedences of AAQ NEPM standards occurred for ozone, sulfur dioxide and PM_{10}. There were no exceedences of the AAQ NEPM standards for carbon monoxide, nitrogen dioxide and lead.

Table 7: 2002 ozone exceedences in Queensland

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

Region/ Performance monitoring station	Standard	Concentration (ppm)	Date	Time	Circumstances
South-east Queensland Rocklea	1-hour	0.118	Feb11	14	Conducive meteorology combined with bushfire emissions
	1-hour	0.109	Mar18	14	Conducive meteorology plus urban emissions
	4-hour	0.105	Feb11	15	Conducive meteorology combined with bushfire emissions
South-east Queensland Flinders View	4-hour	0.083	Mar18	16	Conducive meteorology plus urban emissions

Table 8: 2002 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	1.253	Dec09	20	Industry emissions
		0.620	Oct08	16	Industry emissions
		0.617	Jan24	10	Industry emissions
		0.551	Jul31	16	Industry emissions
		0.545	Sep09	18	Industry emissions
		0.534	Apr01	18	Industry emissions
		0.526	Mar14	09	Industry emissions
		0.478	Oct14	16	Industry emissions
		0.452	Dec01	17	Industry emissions
		0.449	Dec13	18	Industry emissions
		0.447	Feb06	16	Industry emissions
		0.440	Oct19	14	Industry emissions
		0.433	Nov30	14	Industry emissions
		0.410	Jan31	19	Industry emissions
		0.394	May18	15	Industry emissions
		0.386	Jun16	15	Industry emissions
		0.385	Oct12	15	Industry emissions
		0.381	Dec08	18	Industry emissions
		0.369	Oct22	18	Industry emissions
		0.363	Nov20	18	Industry emissions
		0.356	Jan11	11	Industry emissions
		0.351	Dec14	13	Industry emissions
		0.336	Aug22	17	Industry emissions
		0.336	Oct20	15	Industry emissions
		0.336	Dec15	17	Industry emissions
		0.325	Jan25	15	Industry emissions
		0.324	Dec21	20	Industry emissions
		0.316	Aug21	15	Industry emissions
		0.305	Sep07	19	Industry emissions
		0.294	Sep19	18	Industry emissions
		0.288	Jun25	17	Industry emissions
		0.281	Mar12	14	Industry emissions
		0.273	Jun28	16	Industry emissions
		0.272	Sep06	16	Industry emissions
		0.271	Jan13	17	Industry emissions
		0.262	Dec03	18	Industry emissions
		0.261	Oct13	16	Industry emissions
		0.258	Apr14	16	Industry emissions
		0.253	Jan08	17	Industry emissions
		0.236	Jul28	17	Industry emissions
		0.231	Dec25	17	Industry emissions
		0.231	Feb03	10	Industry emissions
		0.229	Feb01	17	Industry emissions
		0.229	Mar27	15	Industry emissions
		0.221	Aug24	16	Industry emissions
		0.214	Dec27	14	Industry emissions
		0.213	Nov07	16	Industry emissions
		0.205	Dec31	16	Industry emissions
		0.201	Sep26	09	Industry emissions
	24-hour	0.081	Dec09	24	Industry emissions

Table 9: 2002 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				
Mountain Creek	146.9	Oct26	24	Dust storm combined with bushfire smoke
	101.4	Oct24	24	Dust storm combined with bushfire smoke
	76.0	Jul04	24	Dust storm
	65.4	Oct25	24	Dust storm combined with bushfire smoke
	59.1	Dec07	24	Bushfire smoke
	56.3	Aug08	24	Bushfire smoke
	51.8	Dec06	24	Bushfire smoke
	50.7	Oct23	24	Dust storm combined with bushfire smoke
South-east Queensland				
Rocklea	177.2	Oct23	24	Dust storm combined with bushfire smoke
	112.8	Oct26	24	Dust storm combined with bushfire smoke
	96.5	Oct24	24	Dust storm combined with bushfire smoke
	95.3	Jul04	24	Dust storm
	74.1	Dec06	24	Bushfire smoke
	73.7	Oct25	24	Dust storm combined with bushfire smoke
	60.1	Dec07	24	Bushfire smoke
South-east Queensland				
Springwood	139.5	Oct23	24	Dust storm combined with bushfire smoke
	122.7	Oct26	24	Dust storm combined with bushfire smoke
	103.0	Oct24	24	Dust storm combined with bushfire smoke
	87.9	Jul04	24	Dust storm
	70.3	Oct25	24	Dust storm combined with bushfire smoke
	53.7	Dec07	24	Bushfire smoke
	50.9	Dec06	24	Bushfire smoke
South-east Queensland				
Helensvale	81.8	Jul04	24	Dust storm
South-east Queensland				
Flinders View	197.2	Oct23	24	Dust storm combined with bushfire smoke
	111.0	Oct26	24	Dust storm combined with bushfire smoke
	103.6	Jul04	24	Dust storm
	103.3	Oct24	24	Dust storm combined with bushfire smoke
	84.4	Oct25	24	Dust storm combined with bushfire smoke
	81.8	Dec06	24	Bushfire smoke
	60.8	Dec07	24	Bushfire smoke
Gladstone				
South Gladstone	197.0	Oct26	24	Dust storm combined with bushfire smoke
	140.2	Oct25	24	Dust storm combined with bushfire smoke
	114.4	Oct24	24	Dust storm combined with bushfire smoke
	83.0	Dec07	24	Dust storm
	69.2	Jul04	24	Bushfire smoke
Mackay				
West Mackay	475.4	Oct24	24	Dust storm combined with bushfire smoke
	466.5	Oct25	24	Dust storm combined with bushfire smoke
	85.9	Oct26	24	Dust storm combined with bushfire smoke
	51.2	Jul05	24	Dust storm
	51.2	Dec07	24	Bushfire smoke
	50.3	Oct27	24	Dust storm combined with bushfire smoke

2002 maximum, second-highest and sixth-highest concentration summaries

Table 10: 2002 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					
Brisbane CBD	272	2.5	Jun12:24	2.3	Jul14:01

Table 11: 2002 summary statistics for daily peak 1-hour NO_2 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	334	0.036	Jul16:18 Aug06:19 Sep10:19	0.036	
Deception Bay	328	0.065	Jul01:24	0.054	Jul31:22
Rocklea	365	0.051	Jul02:18	0.049	May16:19
Springwood	361	0.045	Jul14:20	0.041	Jul02:20 Jul12:19 Jul17:18
Helensvale	272	0.045	Apr20:20	0.041	Apr21:19
Flinders View	331	0.062	Jul14:18	0.058	Jul13:19
Gladstone					
South Gladstone	365	0.036	May14:11	0.032	May31:19

Table 12: 2002 summary statistics for daily peak 1-hour O_3 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	334	0.064	Oct16:15	0.062	Apr20:13
Deception Bay	335	0.071	Apr20:15	0.066	Apr19:15
Rocklea	365	0.118	Feb11:14	0.109	Mar18:14
Springwood	357	0.068	Feb11:13	0.060	Mar18:13
Helensvale	273	0.072	Mar18:16	0.066	Jan12:16
Flinders View	359	0.098	Mar18:16	0.083	Nov10:15
Gladstone					
Targinie	342	0.046	Aug08:14	0.045	Dec11:17

Table 13: 2002 summary statistics for daily peak 4-hour O_3 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	335	0.059	Oct16:16	0.056	Apr20:15
Deception Bay	335	0.067	Apr20:16	0.061	Oct16:18
Rocklea	365	0.105	Feb11:15	0.076	Mar18:15
Springwood	357	0.060	Feb11:15	0.053	Mar18:15
Helensvale	273	0.062	Mar18:14	0.058	Sep25:16
Flinders View	359	0.083	Mar18:16	0.076	Sep26:16
Gladstone					
Targinie	344	0.044	Dec11:17 Dec12:18	0.044	

Table 14: 2002 summary statistics for daily peak 1-hour SO_2 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	361	0.027	May16:10	0.017	Jul12:12
Flinders View	361	0.057	Feb02:11	0.048	May28:12
Gladstone					
South Gladstone	352	0.123	Jun06:12	0.060	May14:11
Townsville					
Stuart	365	0.023	Aug02:13	0.007	Aug09:19
Mount Isa					
Menzies	341	1.254	Dec09:20	0.620	Oct08:16

Table 15: 2002 summary statistics for 24-hour SO_2 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	351	0.003	Jun08 Jun11 Jul02 Jul23 Jul24	0.003	
Flinders View	354	0.006	Feb05 Mar04 Apr04	0.006	
Gladstone					
South Gladstone	345	0.029	Jun06	0.006	Mar23
Townsville					
Stuart	363	0.002	Aug03	0.001	65 days in total
Mount Isa					
Menzies	333	0.081	Dec09	0.064	Dec01

Table 16: 2002 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	322	146.9	Oct26	56.3	Aug10
Rocklea	362	177.2	Oct23	73.7	Oct25
Springwood	351	139.5	Oct23	53.7	Dec07
Helensvale	270	81.8	Jul04	39.8	Aug04
Flinders View	356	197.2	Oct23	81.8	Dec06
Gladstone					
South Gladstone	364	197.0	Oct26	48.9	May18
Mackay					
West Mackay	360	475.4	Oct24	50.3	Oct27

Section D – Data Analysis

This section provides pollutant distribution information for the 2002 year (tables 17 to 23), and multi-year data for nominated trend stations in the Queensland air monitoring plan (tables 24 to 43).

2002 pollutant distribution information

Table 17: Percentiles of daily peak 8-hour carbon monoxide concentrations for 2002

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								
Brisbane CBD	74.5	2.5	2.3	2.1	1.6	1.5	0.8	0.4

Table 18: Percentiles of daily peak 1-hour nitrogen dioxide concentrations for 2002

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	91.5	0.036	0.036	0.034	0.031	0.028	0.021	0.013
Deception Bay	89.9	0.065	0.044	0.042	0.036	0.030	0.023	0.016
Rocklea	100.0	0.051	0.046	0.041	0.037	0.033	0.026	0.018
Springwood	98.9	0.045	0.041	0.036	0.032	0.030	0.026	0.020
Helensvale	74.5	0.045	0.040	0.037	0.034	0.032	0.027	0.021
Flinders View	90.7	0.062	0.057	0.043	0.036	0.033	0.026	0.019
Gladstone								
South Gladstone	100.0	0.036	0.031	0.029	0.026	0.021	0.014	0.009

Table 19: Percentiles of daily peak 1-hour ozone concentrations for 2002

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	91.5	0.064	0.060	0.050	0.043	0.040	0.035	0.031
Deception Bay	91.8	0.071	0.063	0.061	0.048	0.044	0.039	0.033
Rocklea	100.0	0.118	0.075	0.073	0.060	0.054	0.043	0.034
Springwood	97.8	0.068	0.054	0.050	0.043	0.039	0.032	0.027
Helensvale	74.8	0.072	0.063	0.058	0.053	0.046	0.038	0.030
Flinders View	98.4	0.098	0.080	0.078	0.070	0.062	0.049	0.036
Gladstone								
Targinie	93.7	0.046	0.044	0.042	0.038	0.034	0.030	0.027

Table 20: Percentiles of daily peak 4-hour ozone concentrations for 2002

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	91.8	0.059	0.051	0.045	0.040	0.037	0.033	0.028
Deception Bay	91.8	0.067	0.060	0.053	0.044	0.041	0.036	0.031
Rocklea	100.0	0.105	0.068	0.061	0.054	0.047	0.039	0.031
Springwood	97.8	0.060	0.051	0.046	0.039	0.036	0.030	0.025
Helensvale	74.8	0.062	0.057	0.055	0.048	0.042	0.036	0.028
Flinders View	98.4	0.083	0.070	0.066	0.061	0.055	0.045	0.034
Gladstone								
Targinie	94.2	0.044	0.042	0.038	0.035	0.031	0.028	0.024

Table 21: Percentiles of daily peak 1-hour sulfur dioxide concentrations for 2002

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	98.9	0.027	0.012	0.012	0.006	0.005	0.003	0.001
Flinders View	98.9	0.057	0.035	0.033	0.025	0.018	0.010	0.004
Gladstone								
South Gladstone	96.4	0.123	0.040	0.031	0.025	0.020	0.013	0.006
Townsville								
Stuart	95.3	0.023	0.006	0.006	0.004	0.003	0.002	0.001
Mount Isa								
Menzies	93.4	1.254	0.551	0.526	0.385	0.272	0.097	0.001

Table 22: Percentiles of daily 24-hour sulfur dioxide concentrations for 2002

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	96.2	0.003	0.003	0.002	0.002	0.002	0.001	0.001
Flinders View	97.0	0.006	0.006	0.005	0.003	0.003	0.002	0.001
Gladstone								
South Gladstone	94.5	0.029	0.029	0.006	0.004	0.003	0.002	0.001
Townsville								
Stuart	98.9	0.002	0.001	0.001	0.001	0.001	0.000	0.000
Mount Isa								
Menzies	91.2	0.081	0.057	0.055	0.043	0.033	0.010	0.001

Table 23: Percentiles of daily 24-hour PM_{10} concentrations for 2002

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	88.2	146.9	76.0	56.3	36.6	28.1	21.4	16.6
Rocklea	99.2	177.2	95.3	60.1	35.0	30.9	24.4	17.5
Springwood	96.4	139.5	87.9	50.9	34.9	29.8	21.7	15.9
Helensvale	74.0	81.8	44.9	40.8	30.6	26.1	20.3	15.4
Flinders View	97.5	197.2	103.3	60.8	35.9	31.8	23.7	17.1
Gladstone								
South Gladstone	99.7	197.0	83.0	48.5	33.8	26.3	19.4	15.4
Mackay								
West Mackay	98.6	475.4	51.2	46.4	37.4	33.1	25.4	20.2

Multi-year statistics for trend stations

Table 24: Daily peak 8-hour carbon monoxide summary 1998 to 2002

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	*73.9**	*0*	*3.4*	*3.3*	*2.7*	*2.6*	*2.3*
1999	80.8*	0	5.8	3.6	3.5	2.9	2.7
2000	95.0	0	2.7	2.6	2.4	2.2	1.8
2001	97.2	0	3.3	2.4	2.2	1.9	1.6
2002	*74.5**	*0*	*2.5*	*2.3*	*2.1*	*1.6*	*1.5*

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

Table 25: Daily peak 1-hour nitrogen dioxide summary 1995 to 2002

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	91.8	0	0.058	0.054	0.046	0.038	0.033
1996	*67.2**	*0*	*0.048*	*0.043*	*0.042*	*0.034*	*0.030*
1997	91.6	0	0.043	0.038	0.036	0.032	0.028
1998	93.3	0	0.066	0.050	0.039	0.031	0.026
1999	92.4	0	0.058	0.039	0.030	0.028	0.024
2000	94.6	0	0.053	0.038	0.034	0.029	0.025
2001	92.0	0	0.047	0.040	0.039	0.034	0.030
2002	80.5*	0	0.065	0.044	0.042	0.036	0.030

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

Table 26: Daily peak 1-hour nitrogen dioxide summary 1995 to 2002

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	89.9*	0	0.038	0.037	0.035	0.031	0.028
1996	94.3	0	0.055	0.050	0.044	0.037	0.033
1997	93.0	0	0.046	0.042	0.040	0.036	0.030
1998	92.7	0	0.048	0.041	0.039	0.034	0.030
1999	94.1	0	0.046	0.039	0.038	0.032	0.029
2000	94.6	0	0.042	0.040	0.038	0.034	0.031
2001	94.7	0	0.045	0.037	0.036	0.034	0.031
2002	81.9*	0	0.062	0.057	0.043	0.036	0.033

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

Table 27: Daily peak 1-hour nitrogen dioxide summary 1980 to 2002

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	92.3	0	0.070	0.065	0.058	0.043	0.038
1981	76.1*	0	0.070	0.060	0.051	0.041	0.037
1982	92.3	0	0.073	0.058	0.054	0.048	0.040
1983	92.2	0	0.056	0.050	0.042	0.033	0.030
1984	80.5	0	0.076	0.061	0.056	0.048	0.041
1985	88.1	0	0.048	0.044	0.039	0.035	0.031
1986	80.7	2	0.160	0.099	0.069	0.056	0.045
1987	87.8	0	0.089	0.078	0.067	0.060	0.052
1988	*65.1**	*0*	*0.114*	*0.083*	*0.077*	*0.066*	*0.055*
1989	85.3	0	0.073	0.069	0.061	0.054	0.047
1990	75.9	0	0.079	0.070	0.064	0.053	0.046
1991	89.9	0	0.113	0.085	0.071	0.061	0.052
1992	76.7	2	0.157	0.072	0.065	0.052	0.042
1993	87.0	0	0.086	0.066	0.058	0.047	0.040
1994	91.1	0	0.096	0.062	0.057	0.051	0.045
1995	79.6*	0	0.066	0.050	0.048	0.040	0.036
1996	87.9*	0	0.058	0.055	0.044	0.040	0.036
1997	93.0	0	0.061	0.043	0.042	0.039	0.033
1998	93.6	0	0.056	0.046	0.041	0.038	0.033
1999	87.5*	0	0.054	0.044	0.042	0.034	0.029
2000	92.3	0	0.059	0.046	0.043	0.037	0.032
2001	93.7	0	0.049	0.042	0.041	0.035	0.032
2002	90.3	0	0.051	0.046	0.041	0.037	0.033

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

Table 28: Daily peak 1-hour nitrogen dioxide summary 1994 to 2002

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	81.8*	0	0.049	0.047	0.044	0.038	0.028
1995	89.4	0	0.038	0.030	0.028	0.025	0.022
1996	80.7*	0	0.045	0.039	0.035	0.032	0.029
1997	*64.2**	*0*	*0.031*	*0.030*	*0.029*	*0.022*	*0.017*
1998	*71.8**	*0*	*0.022*	*0.020*	*0.018*	*0.015*	*0.012*
1999	87.8*	0	0.034	0.029	0.029	0.025	0.021
2000	94.1	0	0.031	0.025	0.024	0.022	0.019
2001	92.3	0	0.048	0.033	0.031	0.026	0.023
2002	90.4	0	0.036	0.031	0.029	0.026	0.021

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

Table 29: Daily peak 1-hour ozone summary 1995 to 2002

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	91.7	0	0.083	0.075	0.070	0.052	0.047
1996	92.4	0	0.091	0.073	0.064	0.055	0.048
1997	95.5	0	0.079	0.065	0.057	0.048	0.043
1998	90.9	0	0.069	0.060	0.053	0.048	0.044
1999	94.8	0	0.092	0.062	0.057	0.048	0.043
2000	94.9	0	0.070	0.058	0.054	0.046	0.041
2001	84.3*	0	0.079	0.058	0.054	0.048	0.044
2002	82.9*	0	0.071	0.063	0.061	0.048	0.044

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

Table 30: Daily peak 1-hour ozone summary 1980 to 2002

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	92.7	0	0.083	0.078	0.066	0.058	0.050
1981	86.8	0	0.078	0.073	0.062	0.049	0.042
1982	92.3	1	0.102	0.070	0.065	0.057	0.047
1983	93.4	0	0.099	0.071	0.068	0.059	0.041
1984	91.4	1	0.102	0.070	0.064	0.055	0.046
1985	87.5	1	0.105	0.079	0.056	0.047	0.036
1986	81.1*	0	0.074	0.073	0.063	0.057	0.050
1987	*68.2**	*4*	*0.125*	*0.106*	*0.100*	*0.078*	*0.055*
1988	*70.5**	*1*	*0.101*	*0.085*	*0.069*	*0.047*	*0.039*
1989	83.5*	0	0.071	0.058	0.051	0.042	0.036
1990	79.0*	0	0.061	0.051	0.042	0.036	0.031
1991	93.9	0	0.061	0.053	0.045	0.039	0.031
1992	95.4	0	0.069	0.059	0.049	0.039	0.035
1993	95.7	0	0.096	0.063	0.059	0.054	0.050
1994	94.3	1	0.127	0.083	0.073	0.059	0.050
1995	78.1*	0	0.098	0.086	0.070	0.061	0.053
1996	94.1	2	0.135	0.090	0.085	0.071	0.060
1997	94.1	0	0.093	0.085	0.077	0.065	0.053
1998	91.4	1	0.103	0.080	0.078	0.064	0.053
1999	90.5	1	0.135	0.093	0.066	0.057	0.047
2000	92.1	0	0.088	0.076	0.066	0.057	0.049
2001	94.2	0	0.093	0.072	0.063	0.055	0.047
2002	90.4	2	0.118	0.075	0.073	0.060	0.054

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

Table 31: Daily peak 1-hour ozone summary 1994 to 2002

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	93.3	0	0.076	0.069	0.062	0.056	0.048
1995	90.3	0	0.079	0.071	0.065	0.056	0.051
1996	94.9	2	0.125	0.082	0.075	0.063	0.055
1997	93.8	2	0.106	0.094	0.078	0.066	0.056
1998	91.6	0	0.100	0.085	0.076	0.066	0.056
1999	94.0	1	0.127	0.082	0.077	0.055	0.048
2000	94.6	1	0.116	0.073	0.070	0.060	0.054
2001	94.4	0	0.079	0.074	0.070	0.059	0.051
2002	88.6	0	0.098	0.080	0.078	0.070	0.062

Table 32: Daily peak 4-hour ozone summary 1995 to 2002

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	91.7	0	0.077	0.061	0.057	0.047	0.043
1996	92.4	0	0.076	0.065	0.059	0.049	0.045
1997	95.5	0	0.066	0.053	0.050	0.044	0.040
1998	90.9	0	0.059	0.054	0.049	0.043	0.040
1999	94.8	1	0.083	0.055	0.052	0.043	0.039
2000	94.9	0	0.063	0.050	0.049	0.042	0.038
2001	84.3*	0	0.075	0.056	0.050	0.044	0.040
2002	82.9*	0	0.067	0.060	0.053	0.044	0.041

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

Table 33: Daily peak 4-hour ozone summary 1980 to 2002

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	92.7	0	0.076	0.063	0.059	0.049	0.043
1981	86.8	0	0.069	0.056	0.051	0.043	0.038
1982	92.3	0	0.076	0.058	0.053	0.048	0.040
1983	93.4	0	0.078	0.058	0.054	0.047	0.036
1984	91.4	0	0.080	0.059	0.054	0.047	0.041
1985	87.5	1	0.090	0.069	0.051	0.039	0.031
1986	81.1*	0	0.063	0.059	0.052	0.049	0.041
1987	*68.2**	*8*	*0.110*	*0.094*	*0.093*	*0.066*	*0.049*
1988	*70.5**	*1*	*0.081*	*0.065*	*0.050*	*0.041*	*0.035*
1989	83.5*	0	0.060	0.048	0.042	0.037	0.032
1990	79.0*	0	0.053	0.042	0.037	0.030	0.028
1991	93.9	0	0.054	0.043	0.039	0.032	0.026
1992	95.4	0	0.058	0.052	0.042	0.034	0.031
1993	95.7	0	0.074	0.054	0.053	0.048	0.043
1994	94.3	1	0.101	0.075	0.063	0.051	0.043
1995	78.1*	0	0.080	0.070	0.058	0.054	0.047
1996	94.1	1	0.111	0.076	0.070	0.061	0.051
1997	94.1	0	0.080	0.069	0.064	0.056	0.045
1998	91.4	1	0.091	0.068	0.064	0.057	0.049
1999	90.5	1	0.102	0.066	0.058	0.049	0.042
2000	92.1	0	0.072	0.063	0.054	0.049	0.044
2001	94.2	0	0.071	0.063	0.056	0.048	0.043
2002	90.4	1	0.105	0.068	0.061	0.054	0.047

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

Table 34: Daily peak 4-hour ozone summary 1994 to 2002

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	91.7	0	0.072	0.058	0.056	0.047	0.043
1995	92.4	0	0.066	0.062	0.060	0.050	0.044
1996	95.5	2	0.091	0.068	0.065	0.058	0.049
1997	90.9	2	0.090	0.073	0.067	0.056	0.049
1998	94.8	0	0.069	0.065	0.064	0.057	0.049
1999	94.9	1	0.101	0.067	0.064	0.049	0.043
2000	84.3*	1	0.089	0.064	0.061	0.052	0.048
2001	82.9*	0	0.072	0.066	0.058	0.052	0.047
2002	88.6	1	0.083	0.070	0.066	0.061	0.055

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

Table 35: Daily peak 1-hour sulfur dioxide summary 1993 to 2002

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	89.2*	0	0.049	0.030	0.024	0.018	0.014
1994	99.0	0	0.033	0.027	0.025	0.021	0.017
1995	*59.3**	*0*	*0.041*	*0.029*	*0.027*	*0.020*	*0.014*
1996	85.8*	0	0.047	0.037	0.027	0.023	0.017
1997	93.5	0	0.047	0.040	0.035	0.023	0.019
1998	92.8	0	0.090	0.037	0.033	0.024	0.019
1999	92.8	0	0.070	0.035	0.033	0.028	0.021
2000	86.0*	0	0.081	0.049	0.036	0.027	0.022
2001	94.6	0	0.053	0.048	0.043	0.029	0.023
2002	89.4	0	0.057	0.035	0.033	0.025	0.018

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

Table 36: Daily peak 1-hour sulfur dioxide summary 1991 to 2002

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	89.3	0	0.011	0.011	0.009	0.008	0.006
1992	92.1	0	0.052	0.039	0.029	0.020	0.015
1993	95.0	0	0.075	0.059	0.050	0.039	0.032
1994	94.2	0	0.070	0.042	0.040	0.031	0.024
1995	95.9	0	0.168	0.083	0.065	0.047	0.035
1996	96.5	0	0.083	0.053	0.042	0.026	0.018
1997	94.9	0	0.049	0.029	0.023	0.014	0.010
1998	91.0	0	0.076	0.050	0.042	0.027	0.020
1999	90.4	0	0.051	0.042	0.039	0.027	0.022
2000	81.1*	0	0.092	0.071	0.045	0.034	0.024
2001	92.1	0	0.068	0.046	0.035	0.023	0.018
2002	87.6	0	0.123	0.040	0.031	0.025	0.020

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

Table 37: Daily peak 1-hour sulfur dioxide summary 1983 to 2002

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	*66.6**	*25*	*0.725*	*0.515*	*0.430*	*0.270*	*0.200*
1984	91.4	31	1.155	0.555	0.515	0.330	0.185
1985	93.9	7	1.080	0.325	0.210	0.100	0.055
1986	85.4*	50	1.406	1.255	0.788	0.577	0.296
1987	95.1	51	1.755	1.016	0.853	0.546	0.324
1988	87.5*	31	0.798	0.682	0.562	0.342	0.159
1989	86.7	41	0.957	0.585	0.503	0.348	0.241
1990	*50.9**	*6*	*0.577*	*0.493*	*0.222*	*0.145*	*0.091*
1991	*61.5**	*28*	*0.673*	*0.638*	*0.440*	*0.294*	*0.215*
1992	85.7*	25	0.540	0.457	0.406	0.286	0.170
1993	92.1	24	0.718	0.434	0.403	0.282	0.134
1994	87.0	20	0.688	0.483	0.343	0.250	0.135
1995	91.2	11	0.443	0.254	0.239	0.184	0.109
1996	90.7	16	0.598	0.409	0.285	0.198	0.131
1997	91.3	7	0.300	0.256	0.216	0.128	0.083
1998	*46.6**	*16*	*0.693*	*0.548*	*0.368*	*0.265*	*0.190*
1999	87.1*	17	0.675	0.366	0.269	0.202	0.141
2000	92.1	31	0.584	0.373	0.357	0.250	0.191
2001	94.6	41	0.581	0.438	0.422	0.295	0.222
2002	85.6	49	1.254	0.551	0.526	0.385	0.272

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

Table 38: Daily 24-hour sulfur dioxide summary 1993 to 2002

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	88.4*	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	*58.9**	*0*	*0.009*	*0.008*	*0.006*	*0.005*	*0.004*
1996	88.4*	0	0.010	0.005	0.005	0.004	0.004
1997	97.2	0	0.009	0.006	0.005	0.004	0.003
1998	95.8	0	0.011	0.007	0.006	0.004	0.004
1999	96.9	0	0.009	0.007	0.007	0.005	0.004
2000	89.8	0	0.013	0.012	0.008	0.006	0.005
2001	99.4	0	0.014	0.007	0.006	0.004	0.003
2002	89.4	0	0.006	0.006	0.005	0.003	0.003

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

Table 39: Daily 24-hour sulfur dioxide summary 1991 to 2002

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	92.1	0	0.007	0.006	0.006	0.004	0.004
1992	94.4	0	0.012	0.011	0.010	0.009	0.008
1993	98.9	0	0.014	0.010	0.010	0.008	0.007
1994	96.9	0	0.013	0.007	0.007	0.006	0.005
1995	96.6	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	97.7	0	0.012	0.010	0.007	0.005	0.003
1999	94.1	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	98.0	0	0.006	0.005	0.004	0.003	0.002
2002	87.6	0	0.029	0.029	0.006	0.004	0.003

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

Table 40: Daily 24-hour sulfur dioxide summary 1984 to 2002

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	94.1	3	0.094	0.087	0.071	0.053	0.033
1985	97.5	1	0.111	0.050	0.042	0.030	0.024
1986	88.7	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	90.7*	3	0.123	0.091	0.064	0.041	0.032
1989	85.3*	1	0.100	0.066	0.062	0.048	0.035
1990	*44.5**	*1*	*0.088*	*0.078*	*0.072*	*0.052*	*0.046*
1991	*55.2**	*3*	*0.117*	*0.100*	*0.073*	*0.053*	*0.038*
1992	88.4*	0	0.064	0.056	0.052	0.033	0.025
1993	95.5	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	99.2	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	*48.7**	*0*	*0.055*	*0.041*	*0.037*	*0.029*	*0.019*
1999	90.7*	0	0.049	0.036	0.032	0.024	0.015
2000	96.6	0	0.078	0.070	0.055	0.032	0.019
2001	98.6	0	0.075	0.052	0.045	0.033	0.021
2002	85.6	1	0.081	0.057	0.055	0.043	0.033

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

Table 41: Daily 24-hour PM_{10} summary 1997 to 2002

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	92.9	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	96.7	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

Table 42: Daily 24-hour PM_{10} summary 1999 to 2002

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	97.0	0	44.2	28.4	25.5	20.3	17.9
2000	97.8	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	97.5	7	197.2	103.3	60.8	35.9	31.8

Table 43: Daily 24-hour PM_{10} summary 2001 to 2002

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	96.7	4	66.6	51.6	38.0	30.3	25.9
2002	99.7	5	197.0	83.0	48.5	33.8	26.3