

Connell Wagner

Latrobe Valley Air Monitoring Network

Annual Summary for 2005

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FOREWORD

This report presents the annual air quality summary for the Latrobe Valley Air Monitoring Network (LVAMN) for the year 2005. The LVAMN consists of three air monitoring stations and an acoustic sounder operated on behalf of PowerWorks and two air monitoring stations operated on behalf of EPA Victoria. All of these stations were operated and maintained by Connell Wagner.

The two EPA stations are performance monitoring stations for the purposes of the *State environment protection policy (Ambient Air Quality)*. Assessment of air quality against the goals set in the policy is undertaken at these performance monitoring stations.

The data reported has been determined in accordance with the following Australian Standards:

- AS 3580.5.1 - 1993 Methods for sampling and analysis of ambient air – Determination of oxides of nitrogen – Chemiluminescence method.
- AS 3580.4.1 - 1990 Methods for sampling and analysis of ambient air – Determination of sulfur dioxide – Direct-reading instrumental method.
- AS 3580.6.1 - 1990 Methods for sampling and analysis of ambient air – Determination of ozone – Direct-reading instrumental method.
- AS 3580.9.6 - 2003 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM₁₀ high volume sampler with size selective inlet – Gravimetric method.
- AS 3580.9.8 - 2001 Method for sampling and analysis of ambient air – Determination of suspended particulate matter – PM₁₀ continuous direct mass method using a tapered element oscillating microbalance, (TEOM) analyser.
- AS 2923 - 1987 Ambient air - guide for measurement of horizontal wind for air quality applications.

Determination of local visual distance (LVD) has been performed in accordance with EPA Victoria's designated method that is based on AS/NZS 3580.12.1:2001.

All requirements for instrument performance (measured as available data generated for the year) have been met.

The summary is therefore an accurate record of the state of the Latrobe Valley's air quality at this time.

The summaries for all stations were prepared from validated data sets stored on the central computer system housed in Connell Wagner's offices at 26 Buckley Street, Morwell, Victoria.

Validated data has been provided to EPA for archiving, and is available from EPA on request.



John Marsiglio (EPA Victoria)
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LVAMN Operations & Performance Review
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LATROBE VALLEY AIR MONITORING NETWORK

ANNUAL AIR QUALITY COMMENTARY 2005

Summary

Annual air quality summaries and commentaries are presented for each air quality station in the Latrobe Valley Air Monitoring Network (LVAMN) for the year January **2005** to December **2005**.

The highest measured values of sulfur dioxide (SO₂) in the Latrobe Valley can usually be attributed to power station emissions. The highest concentration measured in 2005 (0.297 ppm) was measured at Jeeralang Hill in the Strzelecki Ranges. While this value exceeded the *State Environment Protection Policy (Ambient Air Quality)* (“SEPP”) 1hr Environmental Quality Objective of 0.20 ppm (refer Table 2), the policy Goal (allowing one exceedence of the Objective per year) was met as SO₂ measurements exceeded 0.20 ppm at Jeeralang Hill on 1 day only.

The highest 1hr SO₂ concentration measured on the floor of the Latrobe Valley during 2005 occurred at Rosedale South on 22 December. This concentration, 0.074 ppm, was attributed to power station emissions.

The highest nitric oxide (NO) concentration, 0.225 ppm, was measured at Traralgon on 15 June. This was attributed to urban emissions (traffic, heating and cooking emissions) accumulating during calm stable conditions in the early evening. There is no SEPP Objective for NO levels.

The highest nitrogen dioxide (NO₂) concentration, 0.040 ppm measured at Traralgon on 13 April, also originated from urban emissions during near calm stable conditions. This was well below the SEPP 1hr Objective for NO₂ of 0.12 ppm.

Particulate matter less than 10 microns in diameter (PM₁₀) is measured by two different methods, but all data is compared against the same Objective. The highest 24 hour average PM₁₀ concentration was 44.9 µg/m³, measured at Traralgon. The highest 24 hour average PM₁₀ concentration measured at Moe was 36.9 µg/m³. Neither value exceeded the SEPP 24h Objective of 50 µg/m³, nor were any exceedences of the Objective recorded at Jeeralang Hill and Rosedale South monitoring stations.

The SEPP 1hr Objective for Local Visual Distance (LVD) of 20 km was exceeded on 30 separate days during the year. The SEPP goal is that exceedences should occur on no more than 3 days per year per site. The most exceedence days recorded by a single station was 18 at Traralgon, which breached the SEPP goal. The Goal was also breached at Moe, with 11 exceedence days. Widespread LVD breaches were attributed to extensive fuel reduction burning. The total number of exceedences for the Network is 41, which is comparable with recent years.

The highest 1hr average ozone (O₃) concentration for the year was 0.067 ppm, which occurred on 1 March at Traralgon. This value did not exceed the SEPP 1hr Air Quality Objective of 0.10 ppm.

The highest 4hr rolling average O₃ concentration for the year, 0.059 ppm, occurred at Darnum North on 31 January. This measurement did not exceed the SEPP rolling 4hr O₃ Objective of 0.08 ppm.

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1 INTRODUCTION

Annual summaries of air quality statistics and commentaries for the Latrobe Valley Air Monitoring Network (LVAMN) are presented for the period January to December **2005**. All monitoring stations were operated and maintained by Connell Wagner on behalf of PowerWorks and EPA Victoria. A list of all current LVAMN stations is given in Table 1 and their locations are shown in Figure 1.

The data reported have been determined in accordance with the following Australian Standards:

AS 3580.5.1 - 1993	Oxides of Nitrogen (NO _x , NO ₂ , and NO);
AS 3580.4.1 - 1990	Sulphur Dioxide (SO ₂);
AS 3580.6.1 - 1990	Ozone (O ₃);
AS 3580.9.6 - 2003	Suspended Particulate Matter (PM ₁₀) Hi-Vol method;
AS 3580.9.8 - 2001	Suspended Particulate Matter (PM ₁₀) TEOM method;
AS 2923 - 1987	Measurement of horizontal wind for air quality applications.

Determination of Local Visual Distance (LVD) has been undertaken in accordance with the Environment Protection Authority of Victoria designated method that is based on AS/NZS 3580.12.1:2001.

Table 2 shows the *State Environment Protection Policy (Ambient Air Quality)* ("SEPP") Environmental Quality Objectives and Goals for Victoria (Victoria, 1999). While the Objectives apply to all ambient air in Victoria, it should be noted that evaluation of air quality against the Goals is to be undertaken at performance monitoring stations located in urban or populated areas only. The Moe and Traralgon monitoring stations are performance monitoring stations.

The rural sites of Darnum North, Jeeralang Hill and Rosedale South serve as surveillance sites and measurements are used for air quality modelling, plume impact and other studies.

2 LVAMN OPERATIONS FOR 2005

2.1 Network Operations

Four air monitoring stations were in operation for the complete twelve months; these were Traralgon and Moe urban sites and Rosedale South and Jeeralang Hill rural sites. Darnum North, a rural site, operated for six months only (January to March & October to December).

The parameters measured at each monitoring station are:

Darnum North: Ozone, Wind Speed, Wind Direction for the spring and summer (October to March) period only.

Rosedale South: Nitrogen Oxides, Sulphur Dioxide, Ozone, Local Visual Distance, Dry Bulb Temperature, Wet Bulb Temperature, Wind Speed, Wind Direction, Global Solar Radiation, Ultra-Violet Radiation and Inhalable Particles (HiVol PM₁₀ size selective inlet method).

Jeeralang Hill: Ozone, Sulphur Dioxide, Wind Speed, Wind Direction and Inhalable Particles (Hivol PM₁₀ size selective inlet method).

Moe: Nitrogen Oxides, Sulphur Dioxide, Ozone, Local Visual Distance, Dry Bulb Temperature, Wet Bulb Temperature, Wind Speed, Wind Direction and Inhalable Particles (TEOM continuous PM₁₀ method).

Traralgon: Nitrogen Oxides, Sulphur Dioxide, Ozone, Local Visual Distance, Dry Bulb Temperature, Wet Bulb Temperature, Wind Speed, Wind Direction and Global Solar Radiation and Inhalable Particles (TEOM continuous PM₁₀ method).

An acoustic sounder is located at “The Ridge” in Morwell at the southern end of the PowerWorks building. The sounder measures wind speed, wind direction and temperature at a range of heights to enable more accurate tracking of stack emissions and provides important data for the modelling of emissions and atmospheric dispersion.

The urban monitoring sites of Moe and Traralgon are regarded as “Performance Monitoring” sites and are equipped with continuous analysers in accordance with the NEPM¹ measurement criteria.

A complete list of current LVAMN stations is shown in Table 1 and the locations of these stations are shown in Figure 1.

2.2 Network Performance

All monitoring equipment used in the LVAMN stations performed extremely well for the year. All parameters performed above the individual minimum requirement of 80% valid data capture. Data losses from power interruptions and air conditioner breakdowns (causing over temperature trips) were the most significant causes of lost data (refer to Table 7 for instrument performance details).

Refurbishment of the Traralgon air monitoring station resulted in the station being off-line from 16 November to 16 December and hence having reduced data availability for the year. Nevertheless, annual data availability for Traralgon still exceeded 80%.

3 LATROBE VALLEY AIR QUALITY, 2005

The summary of air quality measurements for the Latrobe Valley Air Monitoring Network for the period January 2005 to December 2005 is shown in Table 3 and Table 4.

The highest values² measured in the Latrobe Valley for each year from September 1980 to December 2005 are shown in Tables 5a & 5b.

Measured concentrations are rounded to the nearest 0.001 ppm, 0.1 km or 0.1 µg/m³ in accordance with reporting protocols agreed under the NEPM.

¹ *National Environment Protection (Ambient Air Quality) Measure*

² The lowest values for local visual distance (LVD).

3.1 Nitric oxide (NO)

Nitric oxide is discharged mainly from combustion processes. It is not considered to be harmful and it has no air quality objective. Its presence in air usually indicates the impact of a combustion source.

The highest concentrations of NO occur at township stations, which measure far higher concentrations of NO than do rural stations, often by a factor of 4 times or more. The highest levels usually occur in near-calm conditions in the evening or early morning in winter when the local emissions from traffic, heating and cooking are not flushed away by the wind.

The two highest NO concentrations at Traralgon were 0.225 ppm on 15 June, and 0.215 ppm on 7 July. The two highest NO concentrations at Moe were 0.172 ppm on 2 May, and 0.171 ppm on 6 June. These urban measurements were characteristic of traffic, heating and cooking emissions accumulating during near calm stable conditions, and were consistent with previous years data.

The two highest NO concentrations measured at the rural Rosedale South station were 0.042 ppm on 20 July and 0.034 ppm on 28 July. As expected, these were considerably lower than at the urban Traralgon and Moe sites.

3.2 Nitrogen dioxide (NO₂)

NO₂ is largely formed in the atmosphere by the oxidation of NO emissions that originate from urban and industrial sources.

Historically the measured levels have been well below the SEPP 1hr Air Quality Objective, and the maximum concentration in 2005 (0.040 ppm at Traralgon on 13 April) was similar to levels measured in previous years. This was again well below the SEPP 1hr Objective for NO₂ of 0.12 ppm.

The highest concentration measured at a rural site was 0.022 ppm at Rosedale South on 6 April.

The highest annual average NO₂ concentration measured at either an urban or rural site during 2005 was 0.008 ppm at Traralgon, well below the SEPP objective of 0.03 ppm.

3.3 Sulfur dioxide (SO₂)

About 95% of all SO₂ in the Latrobe Valley originates from anthropogenic sources. The highest measured values on investigation can usually be attributed to power station emissions.

The highest SO₂ concentration during 2005, 0.297 ppm measured at Jeeralang Hill on 11 January 2005, was attributed to a plume strike from Loy Yang A and B Power Stations occurring under stable conditions during the early morning. The measurement is typical of maxima previously measured at this site.

The SEPP Goal of less than 0.20 ppm for all but one day per year was not exceeded in 2005 at any urban site. Concentrations of SO₂ measured at Jeeralang Hill rural site exceeded 0.05 ppm on 32 days, 0.10 ppm on 10 days and the SEPP Environmental Quality Objective of 0.20 ppm on 1 day.

The highest SO₂ concentration measured on the Latrobe Valley floor was 0.074 ppm. This occurred at Rosedale South on 22 December and was attributed to power station emissions being convectively mixed to ground under unstable conditions. The second highest event was 0.069

ppm also measured at Rosedale South on 15 October. This measurement was also attributed to power station plume impact. These measurements are typical of previous years' measurements at these sites.

The highest 24hr average concentration of SO₂ measured by the LVAMN was 0.032 ppm at Jeeralang Hill on 11 January 2005. This value did not breach the SEPP 24hr Objective of 0.08 ppm. As expected, this event occurred on the same day as the highest 1hr concentration was measured, with the plume impact being evident for approximately 5 hours at the monitoring station.

The SEPP annual average concentration objective for SO₂ is 0.02 ppm and is not to be exceeded. The highest annual average concentration of SO₂ was 0.003 ppm, measured at Jeeralang Hill. This is well below the Objective.

3.4 Ozone (O₃)

Photochemical pollution (the action of sunlight on a mixture of oxides of nitrogen and hydrocarbons) is responsible for most of the measured high levels of ozone in the Latrobe Valley. The SEPP 1hr Air Quality Objective of 0.10 ppm for ozone has been exceeded only once in the Latrobe Valley (0.110 ppm at Darnum North on 6 February 1997). In 2005 the highest 1hr ozone concentration was 0.067 ppm, recorded at Traralgon on 1 March. This is similar to previous years (see Table 5b) and did not breach the Objective.

The highest rolling 4hr average O₃ concentration for 2005 was 0.059 ppm, recorded at Darnum North on 31 January. This is comparable with other annual maxima experienced in years since 1992 (see Table 5b) and did not breach the SEPP 4hr rolling average Objective of 0.08 ppm.

3.5 Visibility reducing particles (measured as LVD)

The SEPP Objective for visibility reducing particles is based on aesthetic considerations. The Objective is measured as local visual distance (which is degraded by airborne particles smaller than 2.5 µm in diameter) and states that the LVD should be at least 20 km. The Goal allows the Objective to be exceeded for no more than 3 days per year per site. The Goal has been breached at one or more sites every year since the commencement of the LVAMN. Low LVD measured at ground level has been found to occur in calm, stable conditions which result in the accumulation of pollution from ground based sources (Joynt, 1988).

The SEPP Objective of 20 km was exceeded on 30 separate days during the year. The objective was breached at Moe on 11 days, at Traralgon on 18 days, and at the rural station, Rosedale South, on 12 days. Breaches occurred at all three stations on 4 days, and at two of three stations on 3 days, indicating widespread visibility degradation on these 7 days. The remaining 23 exceedences occurred at only one station on each given day, indicating a greater likelihood that these were due to local sources.

The majority of LVD breaches at Moe and Traralgon occurring during the evening or early morning were due to local urban (household and traffic) emissions.

LVD exceedences at Rosedale South were investigated with some being attributed to fuel reduction burns conducted by the Department of Sustainability and Environment; these low LVD days also coincided with low LVD measurements at Moe and Traralgon and showed widespread visibility degradation. Other exceedences were attributed to local sources.

3.6 Particulate matter less than 10 microns (PM₁₀)

PM₁₀ (particles less than 10µm) is a measure of inhalable particles that are generally larger than those causing visibility degradation. The Objective and Goal are based on human health considerations. In general, the highest concentrations of 24 hour PM₁₀ measured in the Latrobe Valley can be attributed to bushfires and burning off.

PM₁₀ is measured in two ways in the LVAMN. The urban stations at Moe and Traralgon use a continuous analyser known as a TEOM³, which obtains measurements every hour of the year. 24-hour averages are calculated for each day. Note that the 24hr average concentration values presented in this report have been adjusted for temperature to account for the loss of volatiles, in accordance with the standard method. Values presented in Table 6 have also been adjusted for temperature accordingly.

The rural stations at Rosedale South and Jeeralang Hill use high volume samplers which obtain a 24-hour average measurement on every sixth day.

The highest 24 hour average PM₁₀ concentration of 45 µg/m³ was measured on 1 April at Traralgon. The highest 24 hour average at Moe, 37 µg/m³ occurred on 28 April. These readings were attributed to the widespread smoke plume from fuel reduction burns. The PM₁₀ Objective was not exceeded during 2005.

The highest PM₁₀ measurement at a rural station occurred at Jeeralang Hill, where a 24-hour average PM₁₀ concentration of 33 µg/m³ was recorded on the 22 December. This value did not exceed the SEPP Objective of 50µg/m³.

Monthly and yearly average PM₁₀ concentrations for the LVAMN sites are given in Table 6. The highest annual concentration of PM₁₀ was 17.7 µg/m³ measured at Traralgon. There is no SEPP Objective for the annual concentration, but this measured value is typical of previous years for the LVAMN sites.

³ Tapered element oscillating microbalance

4 REFERENCES

LVAMN Network Database - WINCOLLECT - Validated data from January 2005 to December 2005.

LVAMN Annual Air Quality Commentary, January to December 2004, CWPPI Report No CWPPI/2005/05.

Victoria. (1999). State Environment Protection Policy (Ambient Air Quality), Victoria Government Gazette S19, 9 February 1999. Amendments as per Victoria Government Gazette S240, 21 December 2001, page 48.

Information provided by the Department of Sustainability and Environment (DSE) on fuel reduction burning in the Gippsland Region during 2005.

Station Number	Station Short Name	Station Name	Station Type	Station Start Date	Sampling Height (m agl)	Station Location	
						Coordinates (mE) (mN)	Description
1	DN	Darnum North **	AQR	11/05/79 [%] 25/09/00 [#]	3	413400 5779000	Nilma-Shady Creek Road, Approx 100m north of Halls and Porches Rd.
12	MO	Moe	AQU	05/05/82	3	434900 5773400	Vale St Oval, via South St, Moe
13	TR	Traralgon	AQU	6/01/82	3	459200 5772300	Kay St, Traralgon, adjacent to pool
17	RS	Rosedale South	AQR	2/06/87	3	480500 5772200	West of Willung Road, Rosedale South
36	JH	Jeeralang Hill	AQR	1/09/96	3	454010 5755500	1km north of Jeeralang North Road (Thomson Road)
37	PS	PowerWorks SODAR	AS	11/05/01	Multiple [@]	448550 5766390	South of PowerWorks building, Ridge Rd, Morwell

Notes:

AQR - Air Quality Rural

AQU - Air Quality Urban

AS - Acoustic Sounder

** Darnum North is operated for six months per year: January to March, October to December.

[%] Initial installation with complete instrument set as per Rosedale South.

[#] Commencement of six months per year operation with ozone measurement only.

[@] Measures at various pre-selected heights up to approx 1500metres.

Map reference is the National Topographic Map series 1:100,000 (Sheets 8121 Moe, 8221 Traralgon).

The sampling height of anemometers and wind direction sensors at air monitoring stations are 10m above ground level (agl) at rural sites and 15m above ground level at urban sites.

Table 1: Latrobe Valley Air Monitoring Network Stations, 2005

Pollutant	Averaging Period	Environmental Quality Objectives ¹	Goal - Maximum Allowable Exceedences
Carbon monoxide	8 hours ²	9.0 ppm	1 day a year
Nitrogen dioxide	1 hour 1 year	0.12ppm 0.03 ppm	1 day a year None
Photochemical oxidant (as ozone)	1 hour 4 hours ²	0.10 ppm 0.08 ppm	1 day a year 1 day a year
Sulphur dioxide	1 hour 1 day 1 year	0.20 ppm 0.08 ppm 0.02 ppm	1 day a year 1 day a year None
Lead	1 year	0.50 µg/m ³	None
Particles as PM ₁₀	1 day	50 µg/m ³	5 days a year ³
Visibility Reducing Particles	1 hour	20 km ⁴	3 days a year

Notes to table:

1. Objectives are maximum concentrations in each case, except for visibility reducing particles which is a minimum visual distance.
2. Rolling averages based on consecutive 1 hour averages.
3. Five exceedences per year allowed for daily monitoring (equivalent to 1 exceedence per year where measurements are undertaken on a one day in six basis).
4. Minimum visual distance.

**Table 2. State Environment Protection Policy (Ambient Air Quality)
- Environmental Quality Objectives and Goals**

Important Note:

The above air quality objectives apply to ambient air throughout Victoria.

The urban sites of Moe and Traralgon have been designated “performance monitoring sites” in accordance with the National Environment Protection Measure to monitor and assess the air quality in populated areas.

Rural air quality is monitored at the sites of Darnum North, Jeeralang Hill and Rosedale South. These sites also serve as surveillance sites and measurements are used for air quality modelling, plume impact and other studies.

STATION		DN	MO	TR	RS	JH	SEPP
STATION NUMBER		1	12	13	17	36	Objectives and Goals
NUMBER OF MONTHS IN SERVICE		6 (a)	12	12	12	12	
HOURS OF AVAILABLE DATA (Total annual hours per parameter = 8760 hrs)	NO	N/A	8188	7678	8304	N/A	
	NO ₂	N/A	8181	7678	8304	N/A	
	SO ₂	N/A	8379	7675	8302	8367	
	O ₃	4052	8350	7379	8302	8365	
	LVD	N/A	8383	7417	8301	N/A	
	TEOM	N/A	8729	8006	N/A	N/A	
MAXIMUM MEASURED CONCENTRATION	NO (ppb)	N/A	172	225	42	N/A	
	NO ₂ (ppb)	N/A	39	40	22	N/A	
	SO ₂ (ppb)	N/A	47	61	74	297	
	O ₃ (ppb)	64	62	67	58	58	
MINIMUM MEASURED VISIBILITY	LVD (km)	N/A	6.8	11.2	4.4	N/A	
SECOND HIGHEST DAILY MAXIMUM	NO (ppb)	N/A	171	215	34	N/A	120ppb (b) 200ppb (b) 100ppb (b)
	NO ₂ (ppb)	N/A	36	33	20	N/A	
	SO ₂ (ppb)	N/A	39	60	69	314	
	O ₃ (ppb)	64	59	58	55	56	
FOURTH LOWEST DAILY MINIMUM	LVD (km)	N/A	13.2	12.3	9.3	N/A	20km (c)
DAYS WITH VISIBILITY MINIMUM < 20 km		N/A	11	18	12	N/A	3 days

NOTES TO TABLE

(a) Darnum North is operated for six months per year: January to March and October to December.

(b) Not to be exceeded on more than one day in any one year.

(c) Not to be exceeded on more than three days in any one year.

Table 3: Air Quality January 2005 to December 2005 - 1 Hour Averages

STATION			DN	MO	TR	RS	JH	SEPP Objectives and Goals	
STATION NUMBER			1	12	13	17	36		
NUMBER OF MONTHS IN SERVICE			6 (a)	12	12	12	12		
PERIODS OF AVAILABLE DATA (e.g. 1 period = 24 hours and represents 75% or greater data capture for the period)	24-HOUR NO		N/A	341	334	346	N/A		
	24-HOUR NO ₂		N/A	341	334	346	N/A		
	24-HOUR SO ₂		N/A	349	334	346	349		
	24-HOUR PM ₁₀		N/A	364	334	61	61		
	4-HOUR O ₃ (b)		3473	8720	7683	8301	8713		
MAXIMUM MEASURED CONCENTRATION	24-HOUR NO (ppb)		N/A	55	55	6	N/A		
	24-HOUR NO ₂ (ppb)		N/A	16	16	13	N/A		
	24-HOUR SO ₂ (ppb)		N/A	9	12	16	32		
	24-HOUR PM ₁₀ (µg/m ³)		N/A	36.9	44.9	26.5	32.8		
	4-HOUR O ₃ (b) (ppb)		59	51	55	50	52		
SECOND HIGHEST DAILY MAXIMUM (c)	24-HOUR NO (ppb)		N/A	53	53	6	N/A		80ppb (d) 80ppb (d) 50µg/m ³ (d,g) 50µg/m ³ (f)
	24-HOUR NO ₂ (ppb)		N/A	16	16	8	N/A		
	24-HOUR SO ₂ (ppb)		N/A	7	8	13	25		
	4-HOUR O ₃ (b) (ppb)		57	50	55	46	51		
SECOND HIGHEST DAILY MAXIMUM (c)	24-HOUR PM ₁₀ (µg/m ³)		N/A	N/A	N/A	24.6	23.0		
SIXTH HIGHEST DAILY MAXIMUM (c)	24-HOUR PM ₁₀ (µg/m ³)		N/A	32.8	38.9	N/A	N/A		
DAYS WITH 4-HR O ₃ MAXIMUM > 80ppb			0	0	0	0	0	1 day	
DAYS WITH PM ₁₀ > 50 µg/m ³			N/A	0	0	0	0	See note (e)	
ANNUAL AVERAGE CONCENTRATION	NO (ppb)		N/A	6	9	1	N/A	30ppb (h) 20ppb (h)	
	NO ₂ (ppb)		N/A	7	8	3	N/A		
	SO ₂ (ppb)		N/A	1	2	2	3		
	PM ₁₀ (µg/m ³)		N/A	15.7	16.6	12.6	11.1		
	O ₃ (ppb)		20	15	14	18	23		

NOTES TO TABLE

- (a) Darnum North is operated for six months per year: January to March and October to December.
- (b) 4-hour rolling averages.
- (c) Equal daily maxima counted separately.
- (d) Not to be exceeded on more than one day in any year.
- (e) No more than one day in any year at RS and JH, and no more than five days in any year at MO and TR.
- (f) Not to be exceeded on more than five days in any year.
- (g) One day in six operation.
- (h) Never to be exceeded.

Table 4: Air Quality January 2005 to December 2005 - Longer Term Averages

Year	#1980	#1981	#1982	#1983	#1984	#1985	#1986	#1987	#1988	#1989	#1990	#1991
Parameter	/81	/82	/83	/84	/85	/86	/87	/88	/89	/90	/91	/92
NO (1h, ppm)	0.30	0.44	0.29	0.38	0.41	0.33	0.44	0.34	0.28	0.38	0.32	0.36
NO₂ (1h, ppm)	0.09	0.07	0.05	0.07	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.05
Days>0.12ppm	0	0	0	0	0	0	0	0	0	0	0	0
SO₂ (1h, ppm)	0.05	0.06	0.05	0.05	0.04	0.07	0.09	0.15	0.08	0.09	0.07	0.08
Days>0.20ppm	0	0	0	0	0	0	0	0	0	0	0	0
O₃ (1h, ppm)	0.08	0.09	0.10	0.08	0.08	0.07	0.10	0.08	0.07	0.08	0.06	0.06
Days>0.10ppm	0	0	0	0	0	0	0	0	0	0	0	0
CO (1h, ppm)	4	N/A	5	8	8	6	9	8	5	N/A	N/A	N/A
LVD (1h, km)	4	5	4	4	4	6	5	8	7	5	5	6
Days<20km	&47	&80	47	42	38	36	49	32	14	35	32	44
O₃ (4h, ppm)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Days>0.08ppm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
O₃ (8h, ppm)	0.06	0.06	0.07	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05
Days>0.05ppm	2	2	9	0	1	1	1	3	1	5	2	0
PM₁₀ (24h, µg/m³) *	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50	67	46
Days>50µg/m ³	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1	0
PM₁₀ (24h, µg/m³) +	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Days>50µg/m ³	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

& Incomplete data set during commissioning of the Leeds and Northrup logging system.

Seasonal Year (September to August).

* High volume sampler method.

+ TEOM method (commenced Nov 2002).

N/A Not available.

Table 5a: Air Quality Extremes and SEPP Objective Exceedences

Year	[§] 1992	@1993	@1994	@1995	@1996	@1997	@1998	@1999	@2000	@2001	@2002	@2003	@2004	@2005
Parameter														
NO (1h, ppm)	0.16	0.37	0.22	0.25	0.30	0.36	0.29	0.31	0.28	0.26	0.28	0.25	0.26	0.225
NO₂ (1h, ppm)	0.03	0.05	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.04	0.04	0.05	0.04	0.040
Days>0.12ppm	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SO₂ (1h, ppm)	0.06	0.13	0.17	0.14	0.10	0.20	0.24	0.25	0.29	0.61	0.25	0.23	0.35	0.297
Days>0.20ppm	0	0	0	0	0	0	1	1	0	4	1	1	5	1
O₃ (1h, ppm)	0.05	0.06	0.07	0.07	0.07	0.11	0.07	0.07	0.10	0.08	0.07	0.09	0.07	0.067
Days>0.10ppm	0	0	0	0	0	1	0	0	0	0	0	0	0	0
LVD (1h, km)	7	5	5	11	7	7	7	11	12	9	4	2	4	4.4
Days<20km	9	16	65	42	25	35	38	31 [#]	27 [#]	31 [#]	26 [#]	71 [#]	29 [#]	41
O₃ (4h, ppm)	0.04	0.05	0.07	0.06	0.05	0.09	0.06	0.07	0.06	0.08	0.06	0.09	0.06	0.059
Days>0.08ppm	0	0	0	0	0	1	0	0	0	0	0	1	0	0
O₃ (8h, ppm)	0.04	0.05	0.06	0.06	0.05	0.07	0.06	0.06	0.05	0.07	N/A	N/A	N/A	N/A
Days>0.05ppm	0	0	0	0	0	2	1	0	3	3	N/A	N/A	N/A	N/A
PM₁₀ (24h, µg/m³) *	22	79	58	31	63	55	88	50	36	39	42	85	34	32.8
Days>50µg/m ³	0	1	1	0	1	1	4	0	0	0	0	1	0	0
PM₁₀ (24h, µg/m³) +	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	42	289	57	44.9
Days>50µg/m ³	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	18	1	0

& Incomplete data set during commissioning of the Leeds and Northrup logging system.

§ September 1992 to December 1992.

@ Calendar Year.

* High volume sampler method.

+ TEOM method (commenced Nov 2002).

Exceedences adjusted to account for change in calibration reference temperature

N/A Not available.

Table 5b: Air Quality Extremes and SEPP Objective Exceedences

Table 6: Inhalable Particulate Summary for 2005

From January 2005 through December 2005

PM₁₀ Monthly Averages in µg/m³

Month	JH	RS	MO¹	TR¹
January	12.5	14.2	16.9	16.2
February	11.9	12.7	15.1	14.3
March	11.9	14.6	16.0	16.8
April	16.2	21.1	19.4	22.8
May	13.8	12.1	17.1	19.7
June	9.5	9.3	13.8	17.2
July	6.1	9.3	12.2	13.6
August	7.0	9.0	12.3	12.6
September	5.8	7.8	13.4	12.9
October	11.6	12.1	16.2	15.2
November	10.2	12.2	17.4	16.1 ²
<u>December</u>	<u>17.9</u>	<u>18.5</u>	<u>18.2</u>	<u>21.2²</u>
12 month average	11.1	12.7	15.7	16.6

¹ Moe & Traralgon PM₁₀ data have been adjusted for temperature to account for loss of volatiles – hence TEOM data can be directly compared with high volume sampler data from Rosedale South and Jeeralang Hill.

² Partial month only at Traralgon - new monitoring hut and infrastructure installed between 16 November and 16 December 2005.

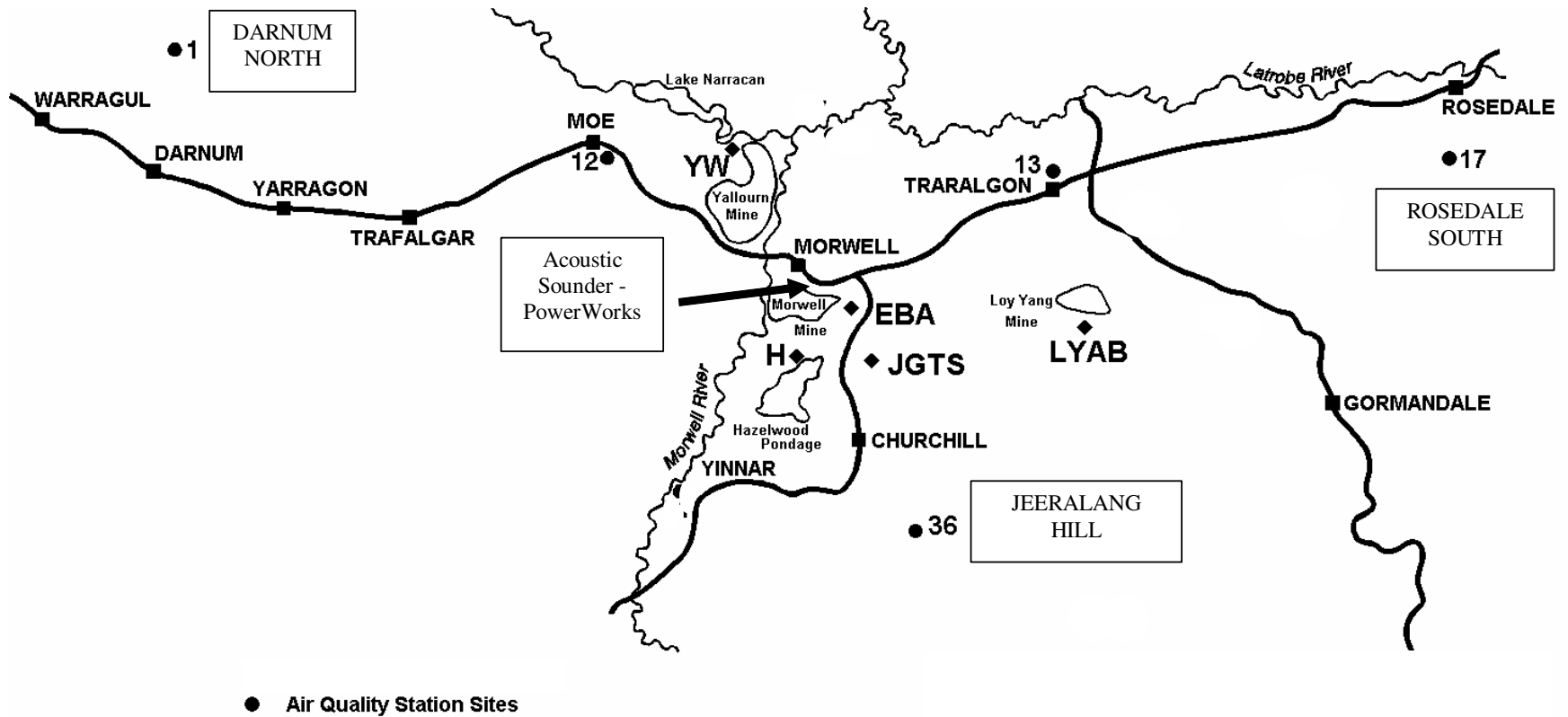
STATION	NO ₂	NO	SO ₂	O ₃	LVD	DBT	WBT	WS	WD	GLB	UVA	TEOM	PM ₁₀
Darnum ¹				93				97	97				
Rosedale	95	95	95	95	95	99	99	99	99	99	99		100
Jeeralang			96	95				99	99				100
Moe	93	93	96	95	96	99	96	99	99			99	
Traralgon ²	88	88	88	84	87	90	86	89	89	87		91	

Table 7: LVAMN Air Quality Instrument Performance Statistics for 2005

The above table represents the percentage of validated data capture for the LVAMN. The maximum achievable data capture for the calibrated parameters NO₂, NO, SO₂, O₃ and LVD is 96%, because 1 hour per day is spent in calibration mode.

1. Darnum North was operated only from 1 January to 31 March and from 1 October to 31 December and the reported percentages relate to this period.
2. Traralgon site was decommissioned on 16 November and a new monitoring station installed and fully operational on 16 December 2005. Statistics therefore have a maximum of 92% possible (11 out of 12 months).

Note: Target for instrument performance is 80% valid data capture per parameter per calendar year.



Major power station sources

YW – Yallourn W

JGTS – Jeeralang (Gas Turbine Station)

EBA – Energy Brix

LYAB – Loy Yang A, Loy Yang B

H – Hazelwood

Figure 1: Latrobe Valley Air Monitoring Network 2005