BMT Cordah Limited
ENVIRONMENTAL CONSULTANCY
AND INFORMATION SYSTEMS

LAQM Updating and Screening Assessment 2006

A Report for Angus Council

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EXECUTIVE SUMMARY

The Updating and Screening Assessment (U&SA) report considers atmospheric pollutant monitoring data and updated information relating to road traffic, transport, industrial, commercial and domestic sources of atmospheric pollutants within the Angus Council area.

The report assesses data in relation to the seven main pollutants listed in the National Air Quality Strategy (NAQS) and compares monitored and predicted concentrations to the objective concentrations set out in the Strategy.

The main findings of the report are presented in the summary table below.

Pollutant	Previous reports	Update
Carbon monoxide (CO)	No potential for exceedence of NAQS objectives	No change De-commissioning of CO analyser from the shared mobile unit planned for 2007
Benzene	No potential for exceedence of NAQS objectives	No change
1,3-Butadiene	No potential for exceedence of NAQS objectives	No change
Lead	No potential for exceedence of NAQS objectives	No change
Nitrogen dioxide (NO_2)	No potential for exceedence of NAQS objectives	No change De-commissioning of NO_2 analyser from the shared mobile unit planned for 2007
Sulphur dioxide (SO_2)	No potential for exceedence of NAQS objectives	No change De-commissioning of SO_2 analyser from the shared mobile unit planned for 2007
Particulates (PM_{10})	2010 NAQS objectives for PM_{10} predicted to be exceeded (various short-term periods of monitoring using TEOM analyser)	New rural background Partisol PM_{10} analyser installed at Glen Isla at beginning of 2006. Gravimetric analysers indicate that PM_{10} concentrations will not exceed the 2010 NAQS objectives for PM_{10} Analysis of particulate content for samples taken from Ferryden indicates a significant proportion (15-40%) of PM_{10} is marine based.

1 INTRODUCTION

1. BMT Cordah Ltd has been commissioned by Angus Council to carry out the 2006 Local Air Quality Management (LAQM) U&SA for 2006. The report has been completed in collaboration with personnel from Angus Council.

Purpose

2. The aim of the report is to summarise the air quality and provide an update on air quality issues within the Angus Council area since the previous review and assessment report.

3. The assessment uses updated information for industrial, transport, commercial and domestic atmospheric emissions combined with current monitoring data to identify areas where there is potential for exceedence of the air quality objectives contained within the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000 (NAQS)[1].

4. The report follows guidance set out in LAQM.TG(03) technical guidance[2], LAQM.PG(04) policy guidance[3] and subsequent guidance amendments[4].

LAQM framework and local authority requirements

5. The Environment Act 1995 and subsequent regulations require local authorities to assess compliance of air quality in their area with the standards and objectives set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000[5] (NAQS). For local authorities within Scotland further regulations are set out in the Air Quality (Scotland) Regulations 2000 and Air Quality (Scotland) Amendment Regulations 2002.

6. The LAQM framework requires that local authorities carry out regular reviews of air quality. The first round of Review and Assessment commenced in 2000 and comprised a four stage approach to the assessment of air quality.

7. The Review and Assessment process was revised in 2003 and now comprises two phases. The first phase of the Review and Assessment is a U&SA. The U&SA considers any changes that have occurred in pollutant emissions and sources since the last round of Review and Assessment that may affect air quality. The second phase is either a Detailed Assessment or a Progress Report depending upon the outcome of the U&SA.

8. The LAQM guidance requires that where a risk of exceedence of an air quality objective at a location with relevant public exposure is identified then a Detailed Assessment is required. A Detailed Assessment will consider any risk of exceedence of an objective to greater depth in order to determine whether it is necessary to declare an Air Quality Management Area (AQMA).

[1] Air Quality Strategy for England, Scotland, Wales and Northern Ireland, January 2000
[2] Part IV of the Environment Act 1995, Local air quality management technical guidance, LAQM.TG(03), Defra et al, January 2003.
[3] Part IV of the Environment Act 1995, Local air quality management policy guidance, LAQM.PG(03), Defra et al, January 2003.
[4] Part IV of the Environment Act 1995, Local air quality management technical guidance update, LAQM.TG(03) – update: January 2006, Defra et al, January 2006.
[5] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Working together for clean air, Defra, January 2000

9. During years when a U&SA is not being conducted local authorities are required to submit a Progress Report detailing ongoing air quality monitoring results and providing updated information on air quality issues within the local authority area. A Progress Report includes information on new developments, policies or monitoring data relating to air quality. Air quality information and data is used to identify changes in air quality that result in a potential exceedence of the NAQS objectives.

10. The second round of Review and Assessment was completed in 2005 and this report commences the third round of Review and Assessment for air quality.

National air quality strategy

11. The NAQS details assessment criteria for eight pollutants in the form of atmospheric concentration levels for which an objective deadline is set. Of the eight pollutants identified only seven are required to be assessed and reported. The pollutants contained within the NAQS and their relevant objectives for Scotland are shown in Table 1.

Table 1: Pollutant Objectives outlined in the NAQS

Pollutant	Air Quality Objective			Date to be achieved by
	Concentration	Measured as	Equivalent percentile	
Benzene	16.25 µg/m^3	running annual mean	-	31 / 12 / 2003
	3.25 µg/m^3	running annual mean	-	31 / 12 / 2010
1,3-butadiene	2.25 µg/m^3	running annual mean	-	31 / 12 / 2003
Carbon monoxide (CO)	10 mg/m^3	running 8 hour mean	-	31 / 12 / 2003
Lead	0.5 µg/m^3	annual mean	-	31 / 12 / 2004
	0.25 µg/m^3	annual mean	-	31 / 12 / 2008
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times per year	1-hour mean	99.79th percentile of 1-hour means	31 / 12 / 2005
	40 µg/m^3	annual mean	-	31 / 12 / 2005
Particulate (PM_{10})	50 µg/m^3 not to be exceeded more than 35 times a year	24-hour mean	90.4th percentile of 24-hour-means	31 / 12 / 2004
	40 µg/m^3	annual mean	-	31 / 12 / 2004
	50 µg/m^3 not to be exceeded more than 7 times a year	24-hour mean	98th percentile of 24-hour-means	31 / 12 / 2010
	18 µg/m^3	annual mean	-	31 / 12 / 2010
Sulphur dioxide (SO_2)	125µg/m^3 not to be exceeded more than 3 times a year	24-hour mean	99th percentile of 24-hour means	31 / 12 / 2004
	350 µg/m^3 not to be exceeded more than 24 times a year	1-hour mean	99.7th percentile of 1-hour means	31 / 12 / 2004
	266 µg/m^3 not to be exceeded more than 35 times a year	15-minute mean	99.9th percentile of 15-minute means	31 / 12 / 2005

Council area

12. Angus Council is located on the East Coast of Scotland between Dundee and Aberdeen. The council area is bordered to the south by Fife and Dundee City Councils, to the west by Perth and Kinross Council and to the north by Aberdeenshire Council. The eastern border of Angus Council area is the North Sea coast. A map detailing the Angus Council area is presented in Figure 1 in Appendix 1.

Population and urban centres

13. The principal towns within Angus are Forfar, Montrose, Monifieth, Carnoustie, Brechin, Kirriemuir and Arbroath. The population of Angus Council area is approximately 108,500 with the majority residing in the coastal towns and the south of the council area, the three main population centres being Forfar, Arbroath and Montrose.

Topography

14. The eastern side of the council area is relatively flat with large expanses of agricultural and coastal land. The Strathmore valley runs north-east from Perth to Stonehaven and represents a swath of lowland bordered to the south by the Sidlaw Hills. The north-west half of the council area is dominated by the foothills and glens of the Grampian Mountains and includes the forested areas, Glen Doll Forest and the Forest of Alyth.

Meteorology

15. The meteorological parameters having the greatest impact upon atmospheric pollutant dispersion and transportation are wind speed and wind direction. Temperature, solar radiation and rainfall also impact upon pollutant concentrations by acting as a catalyst to chemical reactions, creating convective currents or washing pollution out of the atmosphere.

16. Wind roses for Leuchars to the south and Dyce to the north representing typical wind conditions for Angus are shown in the Figure 2 in Appendix 1. The wind roses for Leuchars show distinctly the dominance of westerly winds with a significant proportion of south-easterlies. Calm days are shown to predominantly occur during westerly or north-westerly winds. The wind patterns recorded at Leuchars best represent the southern part of Angus where the predominant wind direction is west along the Strathmore and Tay valleys. Dyce meteorological station is located north of Aberdeen and therefore may not fully represent the weather conditions in the northern area of Angus The wind roses for Dyce show a different wind pattern, which is a better representation of the north and east of the Angus Council area. The wind roses for Dyce indicate a split in dominant wind directions between southerlies and north-westerlies. Calm days are shown to occur predominantly during northerly winds.

Summary of previous assessments

17. Angus Council completed a U&SA in April 2003[6]. The U&SA concluded that it was unlikely that any NAQS objectives would be exceeded within the Angus Council area.

18. During 2004 Angus Council conducted a review of emissions from domestic sources[7] to address issues raised by the Scottish Environment Protection Agency (SEPA) and the Scottish Executive following the U&SA. The review identified twenty-four communities for which further investigation of fuel types and quantities used at domestic properties was required. SEPA recommended that two or three communities with the greatest density of coal burning be investigated to conserve Council resources. The domestic fuel survey was undertaken in 2005 in Glamis, Newbigging and Auchmithie.

19. A review of particulates[8] was conducted in 2004 to assess in detail the emissions and sources of PM_{10} within the Angus Council area. The review assessed monitoring data, emissions of PM_{10} from regulated processes and road traffic. The report concluded that the monitoring data and screening assessment criteria provided in the LAQM.TG(03) technical guidance did not correlate well. The monitoring data indicated exceedences of the 2010 NAQS objectives for PM_{10} but the screening criteria indicated that there was unlikely to be an exceedence of the NAQS objectives. It was therefore concluded that further investigation was required to identify the sources of PM_{10} within the Angus Council area.

20. The Angus Council LAQM Progress Report for 2005[9] reviewed the changes in industrial and domestic sources of pollutants and assessed the updated monitoring data for NO_2, SO_2 and PM_{10}. The report concluded that there was no potential for the exceedence of the NAQS objectives for CO, benzene, 1, 3-butadiene, lead, NO_2 and SO_2. However, based on the Tapered Element Oscillating Monitor (TEOM) results, annual mean concentrations of PM_{10} were predicted to exceed the 2010 NAQS objective at Forfar. It was planned that a Gravimetric partisol analyser would be installed in Forfar to verify the TEOM results. The gravimetric analyser was installed and commenced operation in October 2005. It was concluded that further assessment of Ethibethean Quarry was required with regards to PM_{10} emissions and that domestic fuel surveys would be conducted in Auchmithie, Glamis and Newbigging.

[6] Angus Council LAQM Updating and Screening Assessment 2003, BT Cordah Ltd Report Ref: AGC.005, June 2003.
[7] Domestic Coal – Burning in Angus, Angus Council, July 2004
[8] Review of Particulates, BMT Cordah Ltd Report Ref: AGC.007, October 2004.
[9] Angus Council LAQM Progress Report 2005, BMT Cordah Ltd Report Ref: E_AGC_009, May 2005

Inventory of monitoring

21. Angus Council maintain a network of 15 monitoring sites located throughout the council area. The network includes monitoring sites for SO_2, NO_2 and PM_{10}. Figure 3 shows the location of the NO_2 monitoring sites, Figure 4 shows the location of all SO_2 monitoring sites, and a map of the PM_{10} monitoring sites is shown in Figure 5.

22. An inventory of monitoring sites within Angus Council area is included in Table 2.

Table 2: Monitoring sites within Angus Council area

Monitoring Site	Location	Monitoring method	Pollutant	Classification
A1	Ethie Terrace, Arbroath	PDT	NO_2	Background
A2	Ichape Road, Arbroath	PDT	NO_2	Background
A3	Abbey Path, Arbroath	PDT	NO_2	Roadside
A4	22 Lordburn, Arbroath	PDT	NO_2	Roadside
B1	High Street, Brechin	PDT	NO_2	Roadside
B2	Saccone 1, Brechin	PDT	NO_2	Industry
B3	Saccone 2, Brechin	PDT	NO_2	Industry
CAR 1	High Street, Carnoustie	PDT	NO_2	Kerbside
CAR 2	Kinloch Primary School, Carnoustie	Automatic TEOM Partisol	CO, NO_2, SO_2, PM_{10} PM_{10}	Roadside
FER 1	Ferryden Primary School, by Montrose	Automatic TEOM Partisol	CO, NO_2, SO_2, PM_{10} PM_{10}	Urban background
FOR 1	High Street, Forfar	PDT	NO_2	Kerbside
FOR 2	Chapel Park primary School, Forfar	Automatic TEOM Partisol	CO, NO_2, SO_2, PM_{10} PM_{10}	Roadside
G 1	Glenisla Primary School, Glenisla	Partisol	PM_{10}	Rural background
KIR	Manse Close, Kirriemuir	PDT	NO_2	Kerbside
M1	High Street, Monifieth	PDT	NO_2	Kerbside
M2	High Street, Montrose	PDT	NO_2	Kerbside

Inventory of industrial activities

23. The main areas of industrial activity within Angus are based in Forfar, Montrose, Brechin and Carnoustie. An inventory of all the regulated industrial sites for atmospheric emissions is presented in Table 3.

Table 3: Regulated industrial sites within Angus Council area

Company	Process	Location	Permit / Licence	Atmospheric Pollutants
IPPC processes				
Glaxo Operations UK Limited	Organic Chemicals, Main Organic	Cobden Street, Montrose	IPC/029/1994	NO_x, SO_2, PM_{10}, CO , VOCs, metals & other compounds
Glaxo Operations UK Limited	Incineration	Cobden Street, Montrose	IPC/069/1993	NO_x, SO_2, PM_{10}, CO , VOCs, metals & other compounds
Glaxo Operations UK Limited	Organic Chemicals, General	Cobden Street, Montrose	IPC/048/1994	NO_x, SO_2, PM_{10}, CO , VOCs, metals & other compounds
Glaxo Operations UK Limited	Halogen, Steroids	Cobden Street, Montrose	IPC/047/1994	NO_x, SO_2, PM_{10}, CO , VOCs, metals & other compounds
Glaxo Operations UK Limited	Organic Chemicals, Pilot Plant	Cobden Street, Montrose	IPC/049/1994	NO_x, SO_2, PM_{10}, CO , VOCs, metals & other compounds
Glaxo Operations UK Limited	Organic Chemicals	Cobden Street, Montrose	IPC/021/1994	NO_x, SO_2, PM_{10}, CO , VOCs, metals & other compounds
Transco	Combustion	Kirriemuir Compressor Station, Fofar	IPC/078/1993	NO_x, SO_2, CO, VOCs
PPC Part A processes				
A P Jess (Brechin) Ltd	Slaughtering of cattle	Montrose Road, Brechin	PPC/E/20078	Ammonia, odour
Angus Council	Landfill	Restenneth Landfill Site, Montrose Road, Forfar	PPC/A/1000120 WML/E/20140	PM_{10}, dust, methane
Angus Horticulture Ltd	Combustion, (the conversion of chemical fertilisers into granules)	Polmood, Guthrie, By Forfar	IPC/E/20025 PPC/A/1004267	NO_x, SO_2, PM_{10}, CO, ammonia
Forfar Galvanisers Ltd	Surface treating of metals	Carseview Road, Forfar	PPC/E/20075 PPC/E/30101	NO_x, SO_2, PM_{10}, CO, metals
Saccone Environmental Ltd	Incineration	Brechin Abattoir, Montrose Road, Brechin	IPC/E/20022 Revoked	NO_x, SO_2, PM_{10}, CO, odour
PPC Part B processes				
D Geddes (Contractors) Ltd	Cement and Lime	Ardownie Quarry, Monifieth	APC/E/587	VOCs, NO_X, PM_{10}, dust
Dick Precast Ltd	Cement batching process	Anderson Street, Carnoustie	PPC/B/1000021 APC/E/20100	PM_{10}, dust

Company	Process	Location	Permit / Licence	Atmospheric Pollutants
RMC Readymix Ltd	Cement process	Capo Quarry, Laurencekirk	PPC/B/1000025 APC/E/302	PM_{10}, dust
Tayblast Services Ltd	Coating Process	Lunan Bay, Montrose	PPC/BE/30089	VOCs
Airlie Estates of Cortachy	Combustion (WOB)	Cossacks Garage, Kirriemuir	PPC/E/30091	NO_x, SO_2, PM_{10}, CO
Baldowrie Garage	Combustion (WOB)	79 Dalhousie Street, Monifieth	APC/E/385	NO_x, SO_2, PM_{10}, CO
Baldoukie Motors Ltd	Combustion (WOB)	Baldoukie, Forfar	PPC/E/30159 APC/E/20471	NO_x, SO_2, PM_{10}, CO
Bill Stephen Motors	Combustion (WOB)	Cookston Road, Brechin	PPC/E/30121 APC/E/20454	NO_x, SO_2, PM_{10}, CO
D F & A Collie	Combustion (WOB)	Clerk Street, Brechin	PPC/E/30092	NO_x, SO_2, PM_{10}, CO
Mr P Meston of Careston Motors	Combustion (WOB)	Careston, Brechin	PPC/E/30090	NO_x, SO_2, PM_{10}, CO
G & N Wishart	Combustion (WOB)	Station Road, Friockheim	PPC/E/30198 APC/E/329	NO_x, SO_2, PM_{10}, CO
Laird Bros (Forfar) Ltd	Concrete Process	Whitehill brickworks, Forfar	PPC/B/1000147 APC/E/303	PM_{10}, dust
Carnoustie Castings Ltd	Foundry Process	2A Anderson Street, Carnoustie	PPC/B/1000042 APC/E/20081	PM_{10}
Transco plc	Gas odorisation	Careston Site, Near Brechin.	PPC/B/1000013 APC/E/20087	SO_2, VOCs
Forfar Galvanisers Ltd	Galvanising	Carseview Road, Forfar	PPC/BE/30101	NO_x, SO_2, PM_{10}, CO, metals
Parkgrove Crematorium Ltd	Incineration	Douglasmuir, Friockheim.	PPC/B/1003161 APC/E/307	NO_x, SO_2, PM_{10}, CO
David Ritchie (implements) Ltd	Metal coating process	Carseview Road, Forfar	PPC/E/30070	VOCs, metals
Gemini Corrosion Services Ltd	Metal coating process	Brent Avenue, Forties Road Industrial Estate, Montrose	PPC/E/30058	VOCs, metals
Interplex PMP Ltd	Metal coating and plastic moulding process	Elliot Industrial Estate, Arbroath	PPC/E/30168	VOCs, metals
D Geddes (Contractors) Ltd	Mobile Crushing Process	Swirlburn, Colliston, Arbroath	PPC/B/1000046 APC/E/20043	PM_{10}, dust
Delson Contracts Ltd	Mobile Crushing Process	Orchardbank Ind. Estate, Forfar	PPC/E/30181 APC/E/20469	PM_{10}, dust
D J Laing (contracts) Ltd	Mobile process	Panmure Industrial Estate, Carnoustie	PPC/B/1000139 APC/E/20479	PM_{10}, dust
Ennstone Thistle Ltd	Mobile process	Ethiebeaton Quarry, Kingennie, Monifieth	PPC/E/30138 APC/E/20417	PM_{10}, dust
Ennstone Thistle Ltd	Mobile process	Ethiebeaton Quarry, Kingennie, Monifieth	PPC/E/30139 APC/E/20419	PM_{10}, dust
Abbeygate Filling Station	Petroleum	Academy Street, Forfar	PPC/B/1004860 APC/E/20197	VOCs
Autosales	Petroleum	Lindsay Street, Kirriemuir	PPC/B/1004852 APC/E/20197	VOCs

Company	Process	Location	Permit / Licence	Atmospheric Pollutants
Mr Colin McIntosh	Petroleum	Cairnie Road Service Station, Arbroath	PPC/B/1004874 APC/E/20385	VOCs
Co-Operative Group (CWS) Ltd	Petroleum	Golden Lion Services, Arbroath.	PPC/B/1004868 APC/E/20149	VOCs
Co-Operative Group (CWS) Ltd	Petroleum	Coupar Angus Road, Birkhill.	PPC/B/1004865 APC/E/20410	VOCs
Guthrie Bros (Craigo)Ltd	Petroleum	108-126 Northesk Road, Montrose	PPC/B/1004864 APC/E/20223	VOCs
Kevin Neary Associates	Petroleum	Brechin Service Station, Brechin	PPC/B/1004680 APC/E/20331	VOCs
Shell UK Ltd	Petroleum	Shell North Esk, Montrose.	PPC/B/1004873 APC/E/20313	VOCs
Shell UK Ltd	Petroleum	Bridge Street, Montrose.	PPC/B/1004878 APC/E/20270	VOCs
Shell UK Retail	Petroleum	Queenswell Road, Forfar	PPC/B/1004870 APC/E/20261	VOCs
Somerfield Stores	Petroleum	Barry Road Filling Station, Carnoustie.	PPC/B/1004872 APC/E/20127	VOCs
Transis Ltd	Petroleum	Stracathro Service Area, Stracathro, Angus	PPC/B/1004877 APC/E/20422	VOCs
Wm Morrison Supermarkets plc.	Petroleum	Hume Street, Arbroath	PPC/B/1004715 APC/E/20283	VOCs
Aggregate Industries UK Ltd	Quarrying Process	Edzell Readymix Plant, Arnhall Sand & Gravel Quarry, Edzell	PPC/E/30087	PM_{10}, dust
D Geddes (contractors) Ltd	Roadstone coating process	Walkmill Quarry, Inverkeilor	PPC/E/30059	SO_2, PM_{10}, dust
Ennstone Thistle Ltd	Rock crushing process	Ethibeaton Quarry, Monifeith	PPC/E/30052	PM_{10}, dust
Rosehill Timber	Timber treatment process	Clearymoor Sawmill, Rosehill, Northwater Bridge	PPC/E/30060	PM_{10}, dust, VOCs
Brothock Coachworks	Vehicle re-spraying process	Peasiehill Road, Elliot Industrial Estate, Arbroath	PPC/E/30057	VOCs
Fleet Finish Ltd	Vehicle re-spraying process	Carseview Road, Suttiesfield Industrial Estate, Forfar	PPC/E/30093	VOCs

Description of road network

24. The principal route bisecting Angus Council area roughly north-south is the A90 between Dundee and Aberdeen. Other major roads passing through the area are the A92 coastal route and A94, A923, A926, A928, A933, A934 and the A935. All the major routes cross through the south and east of the council area with much of the north-west section serviced by minor roads.

Description of other transport

25. There are two rail lines passing through Angus. The main route follows the coastal route of the A92 from Dundee to Aberdeen passing through the coastal towns of Monifieth, Carnoustie, Arbroath and Montrose. The route is used by both passenger and freight trains. The Caledonian Railway links

Bridge of Dun at the western end of the Montrose Basin to Brechin and operates a mixture of steam and diesel trains. A narrow gauge miniature steam railway is also operated at Brechin Castle.

26. There are no major port areas within Angus Council area, however there are several small harbours currently used by small fishing vessels and leisure craft. The operational harbours within the council area are Arbroath and the Montrose Basin.

27. There are no airports within Angus Council area the nearest being Dundee Airport 10km to the south of the council boundary. Four small airfields are in operation for gliding, parachute clubs and small private air craft; these are Arbroath, Drumshade, Kinnell and Montrose.

2 CARBON MONOXIDE

28. The NAQS objective for CO for all local authorities is detailed as a maximum 8-hour running mean not to exceed 10mg/m^3. The objective deadline was set as 31st December 2003.

Monitoring data

29. Angus Council monitor CO using an automatic analyser contained within a mobile unit that is shared with Dundee City Council and Perth and Kinross Council. The mobile unit has previously been rotated between monitoring sites on a 3-month basis, but since 2004 has been operated at sites for a period of 6 months. During 2005 the mobile unit was located at Forfar. Monitoring data for 2005 is presented in Table 4.

Table 4: Monitored CO concentrations for Angus (01/10/05 – 13/03/06)

2005 maximum 8-hour mean concentration (mg/m^3)	Data capture rate (%)	No. exceedences of the 8-hour running mean objective
2.5	85.6	0

30. The monitored CO concentrations for Forfar indicate that there were no exceedences of the 8-hour mean CO NAQS objective during 2005. The maximum 8-hour mean concentration recorded was 25% of the objective concentration.

31. The nearest permanent automatic monitoring sites for CO are operated by the neighbouring local authority, Aberdeen City Council. Aberdeen City Council operates one automatic CO analyser located at an urban background site. The measured CO concentrations for 2003 to 2005 are presented in Table 5.

Table 5: Monitored CO concentrations for Aberdeen

2003 maximum 8-hour mean concentration (mg/m^3)	2004 maximum 8-hour mean concentration (mg/m^3)	2005 maximum 8-hour mean concentration (mg/m^3)	No. exceedences of the 8-hour running mean objective (2003 – 2005)
3.1	2.4	3.1	0

32. There have been no exceedences of the 8-hour running mean NAQS objective for CO since the second round of review and assessment.

33. Netcen provide a national database of background concentrations for pollutants listed in the NAQS. The estimated background CO concentrations for Angus Council are presented in Table 6.

Table 6: 2005 Background CO concentrations for Angus (mg/m^3)

	Maximum	Minimum	Mean
Annual mean concentration	0.14	0.08	0.09

34. The maximum 2005 background concentrations of CO are significantly below the 8-hour running mean NAQS objective for CO of 10 mg/m^3, accounting for less than 2% of the objective.

Transport sources

Very busy roads or junctions in built up areas

35. In the last U&SA road traffic flows were assessed to be below the threshold of 30,000 annual average daily traffic (AADT) therefore no busy roads or junctions were assessed for CO. The LAQM.TG(03) Update – January 2006 technical guidance states that consideration of CO from busy roads or junctions should be made if the background concentration is greater than 1mg/m^3. The maximum background concentration with Angus Council area is 0.14mg/m^3 and therefore no assessment is required for CO from transport sources..

3 BENZENE

36. The objective for benzene for all local authorities, contained within the Air Quality Regulations 2000 and Amendment Regulations 2002, is detailed as a running annual mean not to exceed 16.25µg/m^3. The objective deadline was 31st December 2003.

37. An additional objective for benzene for Scottish local authorities, contained within the air quality amendment regulations (Scotland) 2002, is detailed as a running annual mean of 3.25µg/m^3. The objective deadline is 31st December 2010.

38. The EU has also set a limit for benzene of 5µg/m^3 as an annual mean to be achieved by 1 January 2010. The limit is included within the second Air Quality Daughter Directive[10].

Monitoring data

39. Angus Council has not previously and does not currently monitor benzene.

Monitoring data outside an AQMA

40. The nearest automatic monitoring site for benzene is operated by Falkirk Council. However, the monitoring site in Grangemouth within Falkirk Council area is located close to a large industrial area containing an oil refinery and several other companies with benzene emissions. The site is therefore not representative of ambient benzene concentrations within the central Scotland area.

41. Glasgow City Council and Edinburgh City Council operate benzene monitoring sites representative of benzene concentrations in urban areas within central Scotland. The benzene concentrations from Glasgow are measured at a kerbside location and the site in Edinburgh is at an urban centre location. The measured benzene concentrations for 2003 to 2005 are presented in Table 7.

Table 7: Monitored benzene concentrations for Glasgow and Edinburgh

Monitoring site	Annual mean concentration (µg/m^3)				No. exceedences of the annual mean objective (2003 – 2005)		
	2003	2004	2005	Predicted for 2010	16.25µg/m^3	5µg/m^3	3.25µg/m^3
Edinburgh	0.95	0.84	0.64	0.54	0	0	0
Glasgow	1.83	1.41	1.17	0.98	0	0	0

42. There have been no exceedences of the annual mean NAQS objective for benzene since the second round of review and assessment and there is no predicted exceedence for 2010 at the monitoring locations within central Scotland. It is therefore unlikely that benzene concentrations within Angus will exceed either the 2003 or the 2010 NAQS objectives for benzene.

43. The estimated background benzene concentrations for Angus Council taken from the Netcen database are presented in Table 8.

[10] 2nd Air Quality Daughter Directive (2000/69/EC)

Table 8: 2005 Background benzene concentrations for Angus (μg/m^3)

	Maximum	Minimum	Mean
Annual mean concentration 2005	0.21	0.02	0.06
Annual mean concentration 2010	0.19	0.02	0.06

44. The maximum annual mean background concentrations of benzene are significantly below the NAQS objectives for both 2003 and 2010, accounting for less than 2% and 6% of the respective objectives.

Monitoring data within an AQMA

45. There are no AQMAs for benzene within Angus.

Transport sources

Very busy roads or junctions in built up areas

46. The LAQM.TG(03) Update – January 2006 technical guidance states that consideration of benzene from busy roads or junction should be made if the background concentration is greater than 2μg/m^3. The maximum background concentration is 0.31μg/m^3 and therefore no assessment is required for benzene from transport sources.

Industrial sources

47. SEPA were consulted regarding any new or significantly changed regulated processes within Angus Council area.

New industrial sources

48. It was confirmed there have been no new processes with benzene emissions installed within Angus Council area since the previous U&SA.

Industrial sources with substantially increased emissions, or new relevant exposure

49. It was confirmed there have been no processes with significantly changed benzene emissions within Angus Council area. However, two processes were highlighted as having changed emissions and one site is expected to change its emissions in the next two years.

50. David Ritchie (Implements) Ltd still operates it's solvent painting operation but has fallen below the 5 tonne threshold for licensing. This is likely to result in a reduction in VOC emissions.

51. Saccone Environmental Ltd's "phase 1" animal remains incineration operation in the Montrose Road, Brechin has ceased to operate. This was a Part A site. The "phase 1" has now effectively been replaced by the "phase 2" operation, which is still operating. Emissions are predicted to decrease due to the installation of new abatement technology.

52. It was noted in previous assessments that the Glaxo Operations UK Limited intended to decrease and close operations at its site in Montrose. Due to changes in demand for the vaccination and medical products the site is to be upgraded and a PPC application for continuing and varied operations has been submitted to SEPA. Therefore emissions from the site will not decrease as previously stated. However, emissions have not previously been an issue and it is expected that future emissions will not have a significant impact upon local air quality.

Petrol stations

53. It was confirmed from the SEPA registers that there have been no new petrol stations installed within the Angus Council area since the previous updating and screening assessment. Osprey forecourts petrol station in Coronation Road, Montrose has ceased to operate which will result in reduced fugitive emissions of benzene from the site.

54. There are currently thirteen regulated petrol stations within Angus. None of the petrol stations are located near to a road of 30,000 AADT or greater. It is therefore predicted that there is no potential for exceedence of the NAQS objectives for benzene due to petrol stations.

Major fuel storage depots (petroleum only)

55. As stated in previous Review and Assessments there area no major fuel depots located within Angus Council area.

4 1,3-BUTADIENE

56. The objective for 1,3-butadiene for all local authorities, contained within the Air Quality Regulations 2000 and Amendment Regulations 2002, is detailed as a running annual mean not to exceed 2.25µg/m^3. The objective deadline was 31st December 2003.

Monitoring data

57. Angus Council has not previously and does not currently monitor 1, 3-butadiene. The nearest automatic monitoring site for 1,3-butadiene is operated by Glasgow City Council.

58. Glasgow City Council operate one automatic 1,3-butadiene analyser at a kerbside location. The measured 1,3-butadiene concentrations for 2003 to 2005 are presented in Table 9.

Table 9: Monitored 1,3-butadiene concentrations for Glasgow kerbside

Annual mean concentration (µg/m^3)			No. exceedences of the annual mean objective (2003 – 2005)
2003	**2004**	**2005**	**2.25µg/m^3**
0.42	0.28*	0.22	0

* % data capture rate < 75%

59. There have been no exceedences of the annual mean NAQS objective for 1, 3-butadiene since the second round of review and assessment. It is therefore unlikely that 1,3-butadiene concentrations within Angus will exceed the 2003 NAQS objective for 1,3-butadiene.

60. The estimated background 1,3-butadiene concentrations for Angus Council area taken from the Netcen database are presented in Table 10.

Table 10: Background 1,3-butadiene concentrations for Angus Council area (µg/m^3)

	Maximum	Minimum	Mean
Annual mean concentration 2005	0.07	0.01	0.02

61. The maximum 2005 annual mean background concentrations of 1,3-butadiene are significantly below the NAQS objectives for 2003, accounting for less than 4% of the respective objective.

Industrial sources

62. SEPA were consulted regarding any new or significantly changed regulated processes within Angus Council area.

New industrial sources

63. It was confirmed there have been no new processes with 1,3-butadiene emissions installed within Angus Council area since the previous updating and screening assessment.

Industrial sources with substantially increased emissions, or new relevant exposure

64. It was confirmed there have been no processes with significantly changed 1,3-butadiene emissions within Angus Council area. However, two processes were highlighted as having changed emissions.

65. David Ritchie (Implements) Ltd still operates its solvent painting operation but has fallen below the 5 tonne threshold for licensing. This is likely to result in a reduction in VOC emissions.

66. Saccone Environmental Ltd's "phase 1" animal remains incineration operation in the Montrose Road, Brechin has ceased to operate. This was a Part A site. The “phase 1” has now effectively been replaced by the "phase 2" operation, which is still operating. Emissions are predicted to decrease due to the installation of new abatement technology.

67. It was noted in previous assessments that the Glaxo Operations UK Limited intended to decrease and close some operations at its site in Montrose. Due to changes in demand for vaccination and medical products the site is to be upgraded and a PPC application for continuing and varied operations has been submitted to SEPA. Therefore emissions from the site will not decrease as previously stated. However, emissions have not previously been an issue and it is expected that future emissions will not have a significant impact upon local air quality.

5 LEAD

68. Two objectives for lead for all local authorities are contained within the Air Quality Regulations 2000 and Amendment Regulations 2002. The objectives were set as:

- the annual mean concentration not to exceed 0.5µg/m^3 by 31st December 2004; and
- the annual mean concentration not to exceed 0.25µg/m^3 by 31st December 2008.

Monitoring data

69. Angus Council has not previously and does not currently monitor lead. The nearest automatic monitoring sites for lead are operated by Glasgow City Council and North Lanarkshire Council. There is also a monitoring site located in Eskdalemuir within Dumfries and Galloway Council area that is representative of background concentrations within Scotland.

70. Glasgow City Council operate one lead monitoring site at a roadside location and North Lanarkshire Council operate one lead monitoring site at the civic centre in Motherwell. The measured lead concentrations for 2003 to 2005 are presented in Table 11.

Table 11: Monitored lead concentrations for Glasgow, Motherwell and Eskdalemuir

Site	Annual mean concentration (µg/m^3)			No. exceedences of the annual mean objective (2003 – 2005)	
	2003	2004	2005	0.5µg/m^3	0.25µg/m^3
Glasgow	0.015	0.015	0.013	0	0
Motherwell	0.010	0.008	0.003	0	0
Eskdalemuir	0.003	0.002	0.003	0	0

71. There have been no exceedences of the annual mean NAQS objective for lead since the second round of review and assessment. It is therefore unlikely that lead concentrations within Angus will exceed either the 2004 or the 2008 NAQS objectives for lead.

Industrial sources

72. SEPA were consulted regarding any new or significantly changed regulated processes within Angus Council area. It was confirmed that there have been no new industrial sources of lead or industrial sources with substantially increased lead emissions, or new relevant exposure within the Angus Council area since the previous U&SA.

6 NITROGEN DIOXIDE

73. Two objectives for NO_2 for all local authorities are contained within the Air Quality Regulations 2000 and Amendment Regulations 2002. The objectives were set as:

- the annual mean concentration not to exceed 40µg/m^3 by 31st December 2005; and
- the 1-hour mean concentration not to exceed 200µg/m^3 on more than 18 occasions by 31st December 2005.

74. The same two objectives for NO_2 are contained within the 2nd EU Daughter Directive[11] for Air Quality with an objective deadline of 31st December 2010.

Monitoring data

75. Angus Council monitor NO_2 using a network of 10 passive diffusion tubes and an automatic analyser contained within the mobile groundhog unit. During 2005 the mobile groundhog unit was located at Forfar. The 2005 annual mean concentration has been estimated from the period mean concentration using the method provided in the LAQM.TG(03) guidance and data from Aberdeen City Council monitors. The results for the monitoring are presented in Table 12.

Monitoring data outside an AQMA

Table 12: 2005 monitored NO_2 concentrations for Angus (01/10/05 – 13/03/06)

Period mean concentration (µg/m^3)	Estimated annual mean concentration (µg/m^3)	Maximum 1-hour mean concentration (µg/m^3)	Data capture rate (%)	No. exceedences of the 1-hour mean objective
20.6	14.9	91.9	91.5	0

76. There have been no exceedences of the annual mean or 1-hour mean NAQS objectives for NO_2 since the second round of review and assessment.

77. The NO_2 diffusion tubes are prepared and analysed by Dundee City Council Scientific Services, which is UKAS accredited for this purpose. The laboratory use diffusion tubes prepared using 20% triethamolamine (TEA) in water. The results from the diffusion tubes sites since the last round of review and assessment are presented in Table 13.

78. Angus Council does not carry out a co-location study due to the lack of a permanent NO_x analyser. Diffusion tubes results prior to 2003 were not corrected for bias. Results for 2003 and 2004 used the bias correction factor provided by the co-location study operated by the neighbouring local authority, Fife Council, who also uses Dundee City Council Scientific Services for diffusion tube analysis. Co-location studies carried out by Dundee City Council and Fife Council for 2005 were not available at the date of report submission therefore the raw data has been presented in this report and the bias corrected concentrations will be submitted as additional information once they are available.

[11] 1st Air Quality Daughter Directive (1999/30/EC)

Table 13: NO_2 diffusion tube monitoring results

Monitoring Site	Annual mean concentration (µg/m^3)			Data capture rate 2005 (%)
	2003 corrected for bias (0.81)	2004 corrected for bias (0.83)	2005 raw data	
Arbroath 1	-	8.6	10.1	100
Arbroath 2	-	10.1	11.6	92
Arbroath 3	19.7	16.5	18.7	100
Arbroath 4	-	22.2	27.3	100
Brechin 1	15.7	15.8	19.7	100
Brechin 2	-	10.2	12.2	92
Brechin 3	-	10.7	12.4	92
Carnoustie	22.9	23.5	25.4	92
Forfar	23.6	23.5	26.6	100
Kirriemuir	14.0	12.5	15.6	100
Monifieth	22.8	26.5	31.0	92
Montrose	20.2	23.8	27.3	83

79. All sites have a data capture rate above the 70% level recommended for LAQM screening assessments and with the exception of Montrose the data capture rate at all NO_2 diffusion tube monitoring sites was above the 90% required for LAQM Detailed and Further Assessments.

80. There have been no exceedences of the annual mean NAQS objective for NO_2 since the second round of review and assessment.

81. Netcen provide a national database of background concentrations for pollutants listed in the NAQS. The estimated background NO_2 concentrations for Angus Council are presented in Table 14.

Table 14: Background NO_2 concentrations for Angus (µg/m^3)

	Maximum	Minimum	Mean
2005 Annual mean concentration	8.05	1.49	2.48
2010 Annual mean concentration	6.53	1.27	2.05

82. The maximum 2005 background concentrations of NO_2 are significantly below the 1-hour mean NAQS objective for NO_2 of 200µg/m^3, accounting for less than 4% of the objective and less than 21% of the annual mean NAQS objective of 40µg/m^3.

83. The estimated background concentrations of NO_x, NO_2 and PM_{10} were revised in 2005 to reflect monitoring data for 2001 – 2004. Background concentrations on NO_2 have typically been reduced by 2.5µg/m^3. Therefore the Design Manual for Roads and Bridges (DMRB) assessments carried out in the 2003 U&SA that used the 2001 background estimates are likely to have over-estimated NO_2 concentrations at receptors along the assessed roads.

Monitoring data within an AQMA

84. There are no AQMAs for NO_2 within Angus.

Transport sources

85. The Scottish Executive and Angus Council Roads Department provided updated road traffic flows for National routes and local roads within Angus Council area.

86. A DMRB assessment of the five locations along the A92 and Ferry Road within Monifieth were carried out in the last round of review and assessment. Traffic flows from 2001 were projected forward to 2004/5 and 2010 and DMRB assessments were carried out for the six locations. The DMRB assessments indicated that there was unlikely to be an exceedence of NAQS objectives for NO_2 at receptors near to these sites due to road traffic emissions. The projected traffic flows for 2004/5 were greater than the monitored flows for 2004 and therefore it is concluded that the conclusions of the previous U&SA remain valid for these roads.

Narrow congested streets with residential properties close to the kerb

87. There were no narrow congested streets with residential properties close to the kerb identified in the last U&SA.

Junctions

88. Combined traffic flows at seven junctions were identified to be greater than 10,000 AADT.

89. Two junctions in Montrose the A92 / A935 and the A92 / A937 have equivalent background concentrations and AADTs to the DMRB assessment of the A92 (North Esk Road) that was assessed in the 2003 U&SA therefore it is concluded that traffic flows at the junctions will not result in exceedences of the NAQS objectives for NO_2.

90. The A930 / B962 junction in Monifieth was assessed in the 2003 U&SA. The current traffic flows are below the predicted flows for 2005 used in the previous assessment therefore it is concluded that there is unlikely to be an exceedence of NAQS objectives for NO_2 close to the junction.

91. Monitoring sites along roads joining the A935 / B966 junction in Brechin, the A92 / A933 junction in Arbroath and the A932 / A926 and A926 / A94 junctions in Forfar indicate that NO_2 concentrations are unlikely to exceed NAQS objectives close to the junction. DMRB assessments were carried out for these junctions and annual mean NO_2 concentration were predicted to be below the NAQS objective concentration of 40µg/m^3. The DMRB assessments are included in Appendix 2.

92. It is therefore concluded that road traffic emissions at all seven junctions identified are unlikely to result in exceedences of the NAQS objectives for NO_2.

Busy streets where people may spend 1 hour or more close to traffic

93. There were no busy streets where the public might be expected to spend 1 hour or more close to traffic identified in the last U&SA. People may spend an hour or more along the main shopping streets in Arbroath, Brechin, Forfar and Carnoustie, however, traffic flows along the individual roads are below 10,000 AADT.

Roads with high flows of buses and / or HGVs

94. The road with the greatest monitored proportion of HGVs (12.4%) is the B965 east of Frockiheim. This is below the 25% level provided in the LAQM.TG(03) technical guidance and therefore no further assessment has been made on roads with high flows of HGVs and buses.

New roads to be constructed or proposed since the previous round of R&A

95. The conversion to dual carriageway from single lanes of the A92 between Dundee and Arbroath was highlighted in the 2005 LAQM Progress Report. However, this section of the road does not pass through any towns and therefore it is expected to alleviate congestion and thus have a positive effect upon local air quality. There have been no new roads proposed or constructed since the last round of the review and assessment.

Roads with significantly changed traffic flows, or new relevant exposure

96. No new areas of relevant exposure were identified. The LAQM.TG(03) technical guidance states that a significant increase in road traffic is 25%.

97. The roads with a significant change in traffic flow between 2003 and 2004 are the B961 at Kingennie Village (+44%) the A93 at Cotside (+29%), the B966 north of the A90 (+27%) and the A93 at Carnoustie (-26%). The traffic flows on all these local roads are below 10,000 AADT and therefore are unlikely to result in the potential to exceed the NAQS objectives for NO_2.

New development impacts

98. Angus Council confirmed that there had been no retail, residential or commercial developments that were likely to have a significant impact upon local air quality.

Bus stations

99. There are sixteen bus companies operating regular services within Angus, seven of these companies are based within Angus. The flow of buses at each of the termini and bus depots is less than 1000 bus or coach journeys per day, which includes school transport services. It is therefore concluded that bus stations within Angus Council area do not represent the potential for exceedence of the NAQS objectives for NO_2.

Aircraft

100. As stated in previous Review and Assessments there are no significant airports within the Angus Council area.

Industrial sources

101. SEPA were consulted regarding any new or significantly changed regulated processes within Angus Council area.

New industrial sources

102. It was confirmed there have been no new processes with NO_2 emissions installed within Angus Council area since the previous U&SA.

Industrial sources with substantially increased emissions, or new relevant exposure

103. It was confirmed there have been no processes with significantly changed NO_2 emissions within Angus Council area. However, two processes were highlighted as having changes to the NO_2 emissions and one site is expected to change its emissions in the next two years.

104. Macarrons Electroplaters, Orchardbank Industrial Estate, Forfar have reduced their production and now operate only out of Unit 3 (previously Units 1 & 3). Effects on fugitive emissions of NO_x have been assessed and found to be of no significance.

105. Sacone Environmental Ltd's "phase 1" animal remains incineration operation in the Montrose Road, Brechin has ceased to operate. This was a Part A site. The “phase 1” has now effectively been replaced by the "phase 2" operation, which is still operating. Emissions are predicted to decrease due to the installation of new abatement technology.

106. It was noted in previous assessments that the Glaxo Operations UK Limited intended to decrease and close operations at its site in Montrose. Due to changes in demand for vaccination and medical products the site is to be upgraded and a PPC application for continuing and varied operations has been submitted to SEPA. Therefore emissions from the site will not decrease as previously stated. However, emissions have not previously been an issue and it is expected that future emissions will not have a significant impact upon local air quality.

7 SULPHUR DIOXIDE

107. Three objectives for SO_2 for all local authorities are contained within the Air Quality Regulations 2000 and Amendment Regulations 2002. The objectives were set as:

- the 24-hour mean concentration not to exceed 125µg/m^3 on more than 3 occasions by 31st December 2004;
- the 1-hour mean concentration not to exceed 350µg/m^3 on more than 24 occasions by 31st December 2005; and
- the 15-minute mean concentration not to exceed 266µg/m^3 on more than 35 occasions by 31st December 2005.

Monitoring data

108. Angus Council have monitor SO_2 using an automatic analyser contained within the mobile groundhog unit since 2000. The monitor is rotated between three sites (Forfar, Carnoustie and Ferryden).

Monitoring data outside an AQMA

109. The location of the SO_2 monitoring site during 2005 is presented in Figure 5 and detailed in Table 15.

Table 15: Monitored SO_2 concentrations for Angus (01/10/05 – 13/03/06)

Data capture rate (%)	Maximum 24-hour mean concentration (µg/m^3)	Maximum 1-hour mean concentration (µg/m^3)	Maximum 15-minute mean concentration (µg/m^3)	No. exceedences of the objectives
91.3	7.1	17.5	21.5	0

110. The monitored SO_2 concentrations at Forfar for 2005 indicate that there were no exceedences of the 24-hour, 1-hour or 15-minute NAQS objectives. Previously there have been no exceedences of the SO_2 NAQS objectives recorded at Forfar, Ferryden or Carnoustie.

111. The nearest continuous automatic monitoring site for SO_2, recording 1-hour mean and 15-minute mean concentrations, is operated by Aberdeen City Council. The results of the automatic SO_2 monitor in Aberdeen are presented in Table 16.

Table 16: Monitored SO_2 concentrations for Aberdeen

Objective	concentration (µg/m3)			No. exceedences of the objective (2003 – 2005)
	2003	2004	2005	
99th %ile of 24-hour means	17	15	13	0
99.79th %ile of 1-hour means	40	40	31	0
99.9th %ile of 15-minute means	74	82	61	0

112. There have been no exceedences of the SO_2 objectives at the automatic SO_2 monitor site in Aberdeen. SO_2 concentrations within Angus Council area are likely to be below those found in Aberdeen therefore it is unlikely that there is potential for exceedence of the NAQS objectives for SO_2 within Angus Council area.

113. The estimated background SO_2 concentrations for Angus Council area taken from the Netcen database are presented in Table 16.

Table 17: Background SO_2 concentrations for Angus Council area ($\mu g/m^3$)

	Maximum	Minimum	Mean
Annual mean concentration 2005	3.78	0.23	0.77

114. Maximum background concentrations of SO_2 for 2005 are significantly below the relevant NAQS objectives accounting for less than 3% of the 24-hour, 1-hour and 15-minute mean objective concentrations.

Monitoring data within an AQMA

115. There are no AQMAs for SO_2 within Angus Council area.

Industrial sources

116. It was confirmed there have been no new processes with SO_2 emissions installed within Angus Council area since the previous updating and screening assessment.

Industrial sources with substantially increased emissions, or new relevant exposure

117. It was confirmed there were no processes with significantly changed SO_2 emissions within Angus Council area. However, two processes were highlighted as having changes to the SO_2 emissions one site is expected to change its emissions in the next two years.

118. Saccone Environmental Ltd's "phase 1" animal remains incineration operation in the Montrose Road, Brechin has ceased to operate. This was a Part A site. The “phase 1” has now effectively been replaced by the "phase 2" operation, which is still operating. Emissions are predicted to decrease due to the installation of new abatement technology.

119. Michelin Tyres Plc has recently submitted an application to vary its permit to allow burning of heavy fuel oil at its Dundee plant. This is relevant as the Angus Council boundary is less than 1km in the direction of the prevailing wind. It is likely that permission will be granted resulting in potential increases in SO_2. The deployment of an SO_2 monitor is planned by SEPA for a minimum period of 6 months over 2006 in order to monitor ground level SO_2 levels in this area.

120. It was noted in previous assessments that the Glaxo Operations UK Limited intended to decrease and close operations at its site in Montrose. Due to changes in demand for vaccination and medical products the site is to be upgraded and a PPC application for continuing and varied operations has been submitted to SEPA. Therefore emissions from the site will not decrease as previously stated. However, emissions have not previously been an issue and it is expected that future emissions will not have a significant impact upon local air quality.

Small boilers > 5MW$_{(thermal)}$

121. NHS Tayside, Angus College and Angus Council estates services were all contacted regarding small boiler plant capacity. Angus Council Estates Section indicated that there are no boilers of greater than 5MW$_{(thermal)}$ rating operated at schools or other Council owned buildings. NHS Tayside confirmed that no boilers of greater than 5MW$_{(thermal)}$ are operated at hospitals within Angus Council area.

122. All formerly licensed waste oil burning operations have ceased to burn waste oil and are no longer subject to licensing by SEPA. The sites are still able to burn non-waste oil fuels e.g. diesel without any need for licensing. The relevant operators within Angus Council area are;

- Bill Stephen Motors, Cookston Road, Brechin;
- G&N Wishart, Station Road, Friockheim;
- Careston Motors, Careston, By Brechin;
- Baldoukie Motors, Baldoukie, Tannadice, by Forfar;
- Campmuir, Carseview Road, Forfar (site has completely closed so no burning going on at all - formerly two waste oil burners);
- Stuart Butchart Motors, Monifieth;
- Muirhead Garage, Muirhead;
- Maryton Garage, Maryton, Kirriemuir;
- Cossacks Garage, Cortachy, By Kirriemuir;
- Baldowrie Garage, Monifieth; and
- Charles Butler Motor Engineers, Queenswell Road, Forfar.

123. The reduction of waste oil burning at the above sites will result in an improvement to local air quality due to a reduction of CO, benzene, 1,3-butadiene, SO_2, NO_2, and PM_{10} emissions. The emission reductions are likely to be small as the sites are still permitted to burn non-waste oils.

Domestic sources

Areas of domestic coal burning

124. The 2005 LAQM Progress Report for Angus Council provided a screening assessment to identify areas of high density coal burning in domestic properties. The screening assessment identified 24 villages with the potential for coal burning, three of which were determined to represent the worst case. In September 2005 questionnaires were sent to residences in Auchmithie, Glamis and Newbigging. In total to date 195 replies have been received. The data is set out in Table 18.

Table 18: Domestic fuel survey results

	Auchmithie	Glamis	Newbigging
Total No. of Properties	107	111	100
No. of replies received	61	61	73
No. of properties burning coal as a primary fuel	2	6	5
% properties burning coal as a primary fuel	3%	10%	7%
No. of properties burning coal as a secondary fuel	16	16	10
% properties burning coal as a secondary fuel	26%	26%	14%
Estimated number of properties using coal as a primary fuel	3	11	7
Estimated number of properties using coal as a secondary fuel	28	29	14
Estimated number of properties using coal	31	40	21

125. The estimated number of properties burning coal in all three villages is below 100 within 250m^2 which is the level provided in the LAQM.TG(03) technical guidance required for a potential exceedence of the NAQS objective for SO_2.

126. The three villages surveyed represent the communities with the greatest densities of coal burning within Angus, it is therefore concluded that there is unlikely to be an exceedence of the NAQS objectives for SO_2 due to domestic coal burning.

Transport sources

Shipping

127. As stated in previous Review and Assessments there are no harbours or ports within the Angus Council area with significant SO_2 emissions.

Railway locomotives

128. The U&SA completed in 2003 identified one rail line, used by diesel trains, passing along the east coast. An additional two short rail lines are also in operation within the Angus Council area:

- The Caledonian Railway, which is a diesel/steam line linking Bridge of Dun at the western end of the Montrose Basin to Brechin; and
- A small gauge steam train in operation at Brechin Castle.

129. Information gathered for the 2003 U&SA confirmed that there were no locations along the main east coast line within Angus Council where diesel trains might stop for 15 minutes or more. It was concluded that emissions of SO_2 from diesel trains were unlikely to have the potential to exceed the 15-minute NAQS objective for SO_2.

130. The Caledonian Railway owns and operates 9 steam trains and 10 diesel trains on an infrequent basis. The trains are used for leisure trips over the summer months and festive period, operating a maximum of 6 return journeys at weekends and there are no locations within 15m of the railway

tracks where the public would regularly be exposed to train emissions for periods of greater than 15-minutes.

131. The steam train at Brechin Castle Country Park is operated for 3 – 4 hours a day during the summer. It is unlikely that visitors will be within 15m of the idling steam train for periods of greater than 15-minutes and there are no properties within 15m of the track.

132. Updated information on locations along the main line within Angus Council where diesel trains might be left idling for periods of greater than 15 minutes was requested from EWS and First Scotrail. No information has yet been received and therefore it is concluded that the conclusions of the previous assessment remain valid. Any additional data received from EWS and First Scotrail will be reported in the 2007 LAQM Progress report.

8 PARTICULATES

133. Two objectives for PM_{10} for all local authorities are contained within the Air Quality Regulations 2000 and Amendment Regulations 2002. The objectives were set as:

- the annual mean concentration not to exceed 40µg/m^3 by 31st December 2004;
- the 24-hour mean concentration not to exceed 50µg/m^3 on more than 35 occasions by 31st December 2004.

134. Two further objectives for 2010 apply to all Scottish local authorities.

- the annual mean concentration not to exceed 18µg/m^3 by 31st December 2010;
- the 24-hour mean concentration not to exceed 50µg/m^3 on more than 7 occasions by 31st December 2010.

Monitoring data

135. Angus Council has previously operated a mobile groundhog unit, which was shared between Dundee City Council, Fife Council and Perth and Kinross Council. Until 2004 the mobile unit was rotated on a three month basis between the local authorities. Within Angus Council the monitor was located at three sites. During 2004 it was recommended by SEPA that the mobile unit be rotated on a 6 month basis to reduce the amount of down time between site re-locations and to better account for the seasonal variations in pollutant concentrations. The mobile unit contains four monitors including a Tapered Element Oscillating Microbalance (TEOM) analyser for particulates. During 2005 the mobile groundhog unit was located at Forfar.

136. The results of the TEOM are analysed and corrected for bias by Dundee City Council Scientific Services using the 1.3 factor provided in the LAQM.TG(03) technical guidance. In late 2005, it was identified that some of the historic data, recorded between 2000 and 2003, included within the LAQM reports had been corrected for bias twice and thus the reported PM_{10} concentrations were incorrect. Dundee City Council Scientific Services verified the reported concentrations against the raw data and the corrected concentrations are presented in Table 19.

137. Angus Council operate four partisol analysers, three of which were operational during 2005. The partisol at Glenisla commenced operation in 2006 and data available to date is presented in Table 20 with the 2005 data from the other partisol analysers.

138. It was noted in the 2005 LAQM Progress Report that road traffic emissions were not the only significant source of particulate matter within Angus Council area. Therefore during 2005, additional analysis of the partisol filters was conducted to identify the proportion of particulate matter originating from marine sources. The sample analysis is presented in Table 21.

Monitoring data outside an AQMA

139. Monitoring data recorded by the TEOM analyser within the mobile groundhog unit has been recorded at three sites within Angus for periods of between two and six months. The annual mean concentrations for each period of monitoring have therefore been estimated using the technique

provided in the LAQM.TG(03) technical guidance and data from the Aberdeen and Falkirk automatic network sites, which were the nearest automatic monitor sites operating continuously since 2000.

140. Using the factors provided in the LAQM.TG(03) for projecting pollutant concentrations for future years the PM_{10} concentration for 2010 at each site has been calculated and is reported in Table 19.

Table 19: Corrected historic and 2005-2006 PM_{10} concentrations – TEOM analysers

Monitoring Period	Monitoring Location	Period mean ($\mu g/m^3$)	Estimated annual mean ($\mu g/m^3$)	No. of 24-hour means > 50$\mu g/m^3$	Estimated 2010 annual mean ($\mu g/m^3$)	Estimated 2010 No. of 24-hour means > 50$\mu g/m^3$
Apr – May 2000	Forfar	13	14	0	13	< 1
Aug – Sep 2000	Carnoustie	19	18	0	17	< 1
Dec 2000 – Jan 2001	Carnoustie	24	16	2	15	< 1
Sep – Oct 2001	Ferryden	16	17	0	16	< 1
Jan – Feb 2002	Forfar	24	28	0	26	14
Jun – Jul 2002	Ferryden	18	24	2	22	6
Oct – Nov 2002	Carnoustie	21	17	1	16	< 1
Feb – Mar 2003	Carnoustie	39	27	7	26	11
Jul – Aug 2003	Forfar	20	24	0	22	6
Nov 2003 – May 2004	Forfar	29	27	3	25	13
Oct 2005 – Mar 2006	Forfar	18	15	0	14	< 1

141. The corrected data indicates that for the historic data all monitored concentrations during or prior to 2004 are below the 2004 annual mean and 24-hour mean NAQS objectives for PM_{10}. Monitoring data for 2005 to 2006 indicate that concentrations at Forfar will not exceed the 2010 annual mean NAQS objective.

142. The corrected historic PM_{10} concentrations have been projected forward to 2010. In three of the five monitoring periods the concentrations at Forfar are expected to exceed the annual mean NAQS objective and in two of the three monitoring periods concentrations exceed the 24-hour mean NAQS objective for 2010. Exceedence of the 2010 annual mean NAQS objective is predicted for one of the two monitoring periods at Ferryden, where there are no predicted exceedences of the 24-hour mean concentration. At Carnoustie an exceedence of the annual mean and 24-hour mean NAQS objective for 2010 is predicted for one of the four monitoring periods.

143. The variability of the predictions of PM_{10} concentrations at all threes sites for 2010 and the short-periods of monitoring prior to 2004 mean that the projected 2010 concentrations are subject to a large margin of error. The gravimetric analysers installed during 2004 and 2005 have greater accuracy than the TEOM analyser, which indicates that Forfar is the location that records high concentrations of PM_{10} most frequently.

144. The available PM_{10} data for the gravimetric analysers recorded during 2005 is presented in Table 20. Using the factors provided in the LAQM.TG(03) for projecting pollutant concentrations for future years the PM_{10} concentration for 2010 at each site has been calculated and is reported in Table 20.

Table 20: 2005 – 2006 PM_{10} concentrations – Gravimetric analyers

Site	Forfar§	Ferryden	Carnoustie#	Glen Isla 2006*
Annual mean concentration ($\mu g/m^3$)	15.7	12.3	14.6	5.4
98th percentile of 24-hour mean concentrations ($\mu g/m^3$)	-	41.8	-	-
Maximum 24-hour mean concentration ($\mu g/m^3$)	49.0	60.8	-	19.0
No. of exceedences of the 24-hour mean objective concentration of 50$\mu g/m^3$	0	3	-	0
Data capture rate (%)	98.1	80.3	73.1	49.1
No. of days of monitoring	52	365	365	55
Projected annual mean concentration for 2010 ($\mu g/m^3$)	15.1	11.8	14.0	-
Projected No. of exceedences of the 24-hour mean objective concentration of 50$\mu g/m^3$ for 2010	< 1	< 1	< 1	-

data recorded as weekly mean concentrations

* data available for 11/01/06 – 06/03/06

§ data available for 10/11/05 – 30/12/05

145. The projected annual mean PM_{10} concentrations for 2010 are below the NAQS objective of 18$\mu g/m^3$ at Carnoustie, Ferryden and Fofar. The number of exceedences of the 24-hour mean NAQS objective concentration predicted for 2010 is below 1 at Carnoustie, Ferryden and Forfar. As indicated by the TEOM data it is Forfar that recorded the greatest PM_{10} concentrations during 2005 and thus has the highest projected concentration for 2010. However, the 2010 PM_{10} concentrations predicted from the TEOM data are approximately 10$\mu g/m^3$ greater than those predicted from the gravimetric data.

146. The 2005 estimated annual mean PM_{10} concentration of 15$\mu g/m^3$ recorded by the TEOM analyser correlates well with the 2005 annual mean concentration of 15.7$\mu g/m^3$ recorded by the gravimetric analyser at Forfar. The analysers co-located for less than 6-months therefore a gravimetric co-location factor was not calculated.

147. Technical difficulties in installing the Partisol at Forfar meant data at this site is only available for November and December in 2005. The Partisol analyser at Carnoustie records weekly PM_{10} concentrations therefore no 24-hour mean concentrations are available for this site.

148. The data capture rates at all sites except Forfar are below the required 90% for a Detailed Assessment however, the data capture rates at Ferryden and Carnoustie are greater than the 70% data capture rate recommended for LAQM screening assessments. Although the data capture rate at Forfar was greater than 90% only two months data were recorded during 2005. Therefore it is intended to maintain the two Partisol sites with the lowest data capture rates (Carnoustie and GlenIsla) and the Partisol site at Forfar to ensure PM_{10} concentrations are accurately monitored for a full year.

149. The 2006 PM_{10} concentrations recorded at Glen Isla indicate that background concentrations of PM_{10} in the area are in the region of 5µg/m^3. Data are currently available for February and March and therefore annual mean data and projected concentrations for 2010 will be reported in the 2007 LAQM Progress Report.

150. Angus Council has undertaken additional analysis of the Partisol filters at Ferryden to determine the marine derived content of the PM_{10} concentrations. The filters were analysed by Dundee City Council Scientific Services who also conducted a seasonal wind rose analysis to determine the mean direction of origin for each sample analysed. The results of the PM_{10} content analysis are presented in Table 21 and the wind rose analysis in Figure 7. A detailed description of the analysis method is provided in Appendix 3.

Table 21: PM_{10} composition analysis for Ferryden

Sample date	Total PM_{10} mass (µg)	Mean PM_{10} concentration (µg/m^3)	Marine component mass (µg)	Marine component proportion (%)
15/03/05 – 28/03/05	7806	23.8	1164.8	14.9
29/03/05 – 11/04/05	6222	19	1121.1	18.0
12/04/05 – 25/04/05	5381	16.6	1607.8	29.9
26/04/05 – 09/05/05	3454	10.6	1050.4	30.4
10/05/05 – 23/05/05	4093	12.7	1141.9	27.9
24/05/05 – 06/06/05	3385	10.5	1347.8	39.8
07/06/05 – 20/6/05	4516	13.9	1310.4	29.0
21/06/05 – 04/07/05	3581	11.1	1216.8	34.0
19/07/05 – 01/08/05	1886	5.6	713.4	37.8
02/08/05 – 15/08/05	3449	10.7	528.3	15.3

151. The analysis shows that the maximum percentage of marine components of PM_{10} occurred at the end of May. The proportion of marine component varied between 15% and 40%, which represents a significant portion of the total PM_{10} concentration.

152. The wind roses vary across the four seasons with PM_{10} concentrations containing a greater proportion of marine components occurring in spring. PM_{10} concentrations along with proportion of marine component are typically lowest during the summer months. The dominance of westerly and south westerly winds during the winter months means that there are fewer days when a high proportion of marine component was measured in the PM_{10} samples. Air bone particulate matter from marine sources during westerly and south westerly winds is typically blown over the North Sea rather than over Angus.

153. The estimated background PM_{10} concentrations for Angus Council area taken from the netcen database are presented in Table 22.

Table 22: Background PM_{10} concentrations for Angus Council area (µg/m^3)

	Maximum	Minimum	Mean
Annual mean concentration 2005	18.1	12.2	13.2
Annual mean concentration 2010	17.0	11.6	12.6

154. Maximum background concentrations of PM_{10} for 2005 are below the 24-hour mean NAQS objective for 2010, accounting for less than 37% of the objective concentration of 50µg/m^3. However, the maximum background concentrations of PM_{10} for 2005 are above the 2010 annual mean NAQS objective concentration of 18µg/m^3.

155. Maximum background concentrations of PM_{10} for 2010 are below both the annual mean and the 24-hour mean NAQS objectives for 2010, accounting for 94% of the annual mean and 34% of the 24-hour mean objective concentrations respectively.

156. The minimum annual mean background concentration for Angus taken from the database is 12.2µg/m^3, which is more than double the monitored concentration at the rural background Partisol analyser in Glen Isla. It therefore appears that background concentrations within rural areas in Angus are being overestimated in the National database. A comparison of background concentrations will be made upon completion of a full year of monitoring at the Glen Isla site.

Monitoring data within an AQMA

157. There are no AQMAs for PM_{10} within Angus Council area.

Transport sources

158. Updated road traffic survey data was obtained from the Scottish Executive and Angus Council Roads Department. The data provided by the Scottish Executive covered the A90 between Dundee and Brechin. Road traffic flows along this route have not changed significantly with all recorded flows indicating an increase of 1 to 3%.

159. The traffic counts provided by the Angus Council Roads Department cover the minor roads and indicate that traffic flows at five locations on the A92 and at one location on the A93 and A923 are greater than 10,000 AADT.

Busy roads and junctions in Scotland

160. DMRB assessments of the five locations along the A92 and Ferry Road within Monifieth were carried out in the last round of review and assessment. Traffic flows from 2001 were projected forward to 2004/5 and 2010 and DMRB assessments were carried out for the five locations. The DMRB assessment indicated that there was unlikely to be an exceedence of NAQS objectives for PM_{10} at receptors near to these sites due to road traffic emissions. The projected traffic flows for 2004/5 were greater than the monitored flows for 2004 and therefore it is concluded that the conclusions of the previous U&SA remain valid for these roads.

161. The DMRB assessment for the A93 is included in Appendix 2. The DMRB model predicts that the annual mean and 24-hour mean concentrations at properties along Coupar Road in Birkhill are below the relevant PM_{10} NAQS objectives for 2004 and 2010.

Junctions

162. Combined traffic flows at seven junctions were identified to be greater than 10,000 AADT.

163. Two junctions in Montrose the A92 / A935 and the A92 / A937 have equivalent background concentrations and AADTs to the DMRB assessment of the A92 (North Esk Road) that was assessed in the 2003 U&SA therefore it is concluded that traffic flows at the junctions will not result in exceedences of the NAQS objectives for PM_{10}.

164. The A930 / B962 junction in Monifieth and A92 / A933 junction in Arbroath were assessed in the 2003 U&SA the current traffic flows are below the predicted flows for 2005 used in the previous

assessment therefore it is concluded that there is unlikely to be an exceedence of NAQS objectives for PM_{10} close to the junction.

165. DMRB assessments for the A935 / B966 junction in Brechin and the A932 / A926 and A926 / A94 junctions in Forfar indicate that PM_{10} concentrations are unlikely to exceed NAQS objectives close to the junction. DMRB assessments were carried out for these junctions and annual mean PM_{10} concentrations were predicted to be below the 2010 NAQS objective concentration of 18µg/m^3. The DMRB assessments are included in Appendix 2.

166. It is therefore concluded that road traffic emissions at all seven junctions identified are unlikely to result in exceedences of the NAQS objectives for PM_{10}.

Roads with high flows of buses and / or HGVs

167. The road with the greatest monitored proportion of HGVs (12.4%) is the B965 east of Frockiheim. This is below the 25% level provided in the LAQM.TG(03) technical guidance and therefore no further assessment has been made on roads with high flows of HGVs and buses.

New roads to constructed or proposed since the previous round of R&A

168. There have been no new roads proposed or constructed since the last round of review and assessment. The dualling of the A92 single carriage way between Dundee and Arbroath was granted planning permission last year. However, this section of the road does not pass through any towns and therefore it is expected to alleviate congestion and thus have a positive effect upon local air quality.

Roads with significantly changed traffic flows, or new relevant exposure

169. No new areas of relevant exposure were identified. The LAQM.TG(03) technical guidance states that a significant increase in road traffic is 25%.

170. The roads with a significant change in traffic flow between 2003 and 2004 are the B961 at Kingennie Village (+44%) the A93 at Cotside (+29%), the B966 north of the A90 (+27%) and the A93 at Carnoustie (-26%). The traffic flows on all these local roads are below 10,000 AADT and therefore are unlikely to result in the potential to exceed the NAQS objectives for PM_{10}.

Roads close to the objective during the second round of Review and Assessment

171. DMRB assessments carried out as part of the 2003 U&SA indicated that there were no assessed roads close to the NAQS objectives for PM_{10}.

New development impacts

172. Angus Council confirmed that there had been no retail, residential or commercial developments that were likely to have a significant impact upon local air quality.

Aircraft

173. As stated in previous Review and Assessments there are no major airports within the Angus Council area.

Industrial sources

174. It was confirmed there have been no new processes with PM_{10} emissions installed within Angus Council area since the previous updating and screening assessment.

Industrial sources with substantially increased emissions, or new relevant exposure

175. It was confirmed there have been no processes with significantly changed PM_{10} emissions within Angus Council area. However, two processes were highlighted as having changes to the PM_{10} emissions and one site which is expected to change its emissions within the next two years.

176. Saccone Environmental Ltd's "phase 1" animal remains incineration operation in the Montrose Road, Brechin has ceased to operate. This was a Part A site. The “phase 1” has now effectively been replaced by the "phase 2" operation, which is still operating. Emissions are predicted to decrease due to the installation of new abatement technology.

177. Ennstone Thistle Ltd has ceased operation of the roadstone coating process at Cunmont Quarry, by Newbigging. This is likely to reduce PM_{10} emissions from the site.

178. It was noted in previous assessments that Glaxo Operations UK Limited intended to decrease and close operations at its site in Montrose. Due to changes in demand for vaccination and medical products the site is to be upgraded and a PPC application for continuing and varied operations has been submitted to SEPA. Therefore emissions from the site will not decrease as previously stated. However, emissions have not previously been an issue and it is expected that future emissions will not have a significant impact upon local air quality.

Quarries / landfill sites / opencast coal / handling of dusty cargo at ports etc.

179. Previous Review and Assessments identified quarry and landfill sites within Angus Council area with potential fugitive PM_{10} emissions. Ethiebeaton Quarry was identified as a dust emitting process where the background PM_{10} concentration was less than16$\mu g/m^3$ and there were several receptors within 200m of the site. Emissions from all other dust emitting processes in Angus Council area were assessed to be unlikely to result in exceedences of the NAQS objectives.

180. Applications for cement batching plants at Ethiebeaton Quarry in Monifieth and Cunmont Quarry in Newbigging have recently been submitted to SEPA. This is likely to result in increased PM_{10} concentrations in the vicinity of both sites. There are no relevant receptors in the vicinity of Cunmont Quarry therefore it is concluded that it does not represent a potential exceedence of NAQS objectives.

181. The revised background PM_{10} concentration estimates for 2004 indicate that the 2010 background concentration at Ethiebeaton Quarry is less than16$\mu g/m^3$. In previous assessments OS 1:50,000 scale maps were used to identify five buildings within 200m of the quarry boundary. OS 1:10,000 scale maps were investigated to identify the buildings previously identified. The five buildings comprise three receptors a leisure centre, a motel and a garden centre. It is unlikely that people will

be present at the garden centre or leisure centre for periods of 24-hours or more and therefore they do not represent locations of relevant public exposure. However, there may be members of the public at the motel for periods of 24-hours or more. The nearest receptors to Ethibeaton Quarry and their proximity to the dust emitting process are listed in Table 23.

Table 23: Receptors close to Ethiebeaton Quarry

Receptor	Grid Reference	Distance from Quarry boundary (m)	Distance from dust emitting process (m)
Leisure centre	NO 48700 33650	100	300
Motel	NO 48550 33630	200	450
Garden centre	NO 48850 33640	200	350

182. The technical guidance LAQM.TG(03) specifies that the screening assessment should be carried out using the distance from the source to receptor rather than from the site boundary to the receptor. The distance of each receptor from the dust emitting process is greater than 200m which indicates that the site does not currently have the potential for exceedence of the NAQS objectives.

183. There was one complaint received during 2005, from a customer at the leisure centre, which related to dust. It was not determined whether dust originated from the quarry or another source in the area.

184. The screening assessment indicates that there is unlikely to be an exceedence of NAQS objectives for PM_{10}, however due to the additional PM_{10} emissions likely to arise from the proposed cement batching plant at the quarry and the received dust complaint, particulate and dust emissions from Ethiebeaton Quarry will be considered further in any future planning applications for expansion or variation of processes and atmospheric emissions.

Domestic sources

Areas of domestic coal burning

185. The 2005 LAQM Progress Report for Angus Council identified several villages with a requirement for further investigation of domestic coal burning, three of which were determined to represent the worst case within Angus. In September 2005 questionnaires were sent to residences in Auchmithie, Glamis and Newbigging. In total to date 195 replies have been received. The data is set out in Table 24.

Table 24: Domestic fuel survey results

	Auchmithie	Glamis	Newbigging
Total No. of Properties	107	111	100
No. of replies received	61	61	73
No. of properties burning coal as a primary fuel	2	6	5
% properties burning coal as a primary fuel	3%	10%	7%
No. of properties burning coal as a secondary fuel	16	16	10
% properties burning coal as a secondary fuel	26%	26%	14%
Estimated number of properties using coal as a primary fuel	3	11	7
Estimated number of properties using coal as a secondary fuel	28	29	14
Estimated number of properties using coal	31	40	21

186. The estimated number of properties burning coal in all three villages is below 50 within an area of 250m^2 which is the level provided in the LAQM.TG(03) technical guidance required for a potential exceedence of the NAQS objective for PM_{10}.

187. The three villages surveyed represent the communities with the greatest densities of coal burning within Angus, it is therefore concluded that there is unlikely to be an exceedence of the NAQS objectives for PM_{10} due to domestic coal burning.

Other sources

188. The eastern boundary of the council area is the east coast of Scotland where there are large expanses of sand beach which represents a large natural source of dust and PM_{10}. Large sections of Angus Council area are used for agricultural purposes the crop fields represent another source of PM_{10} and dust.

189. It has been noted that during certain meteorological conditions sand, soil and dust become air borne and are often transported across the council area. These periods of high dust and PM_{10} concentration are evident in monitoring data and visible as dust clouds particularly in the spring to early summer period when the ground can be dry and is not vegetated. During spring 2006 after a particularly dry winter and late spring there were several days when dust clouds were observed throughout the council area.

190. The compositional analysis of PM_{10} at Ferryden indicated that the maximum concentrations were recorded during the spring and notably when the wind was from the south and east.

9 SUMMARY OF FINDINGS AND CONCLUSIONS

Changes to atmospheric emission sources

191. There were no new or significantly changed industrial sites or small boiler sites identified since the last U&SA. One new quarry was identified and assessed not to have a significant impact upon local air quality. Several sites operating waste oil burners have ceased burning waste oil and are therefore no longer regulated by SEPA.

192. Road traffic flows along major routes within the area have not changed significantly (< 3%) since the Detailed Assessment. Current road traffic flows are below the projected traffic flows for busy roads and junctions assessed during the last U&SA. Three additional junctions and one road were identified as having an AADT greater than 10,000 and were thus assessed using the DMRB screening model. The assessment concluded that there was unlikely to be an exceedence of NO_2 or PM_{10} NAQS objectives at nearby receptors due to road traffic emissions.

193. There was no significant change identified in other forms of transport within the area since the last U&SA.

194. Further assessment of domestic fuel use within the area indicate that the density of coal burning properties is less than 50 properties per $500m^2$ and is therefore unlikely to result in exceedences of the NAQS objectives for SO_2 or PM_{10}.

Changes to pollutant monitoring

195. The CO, SO_2, NO_X, and PM_{10} TEOM analysers contained within the mobile groundhog unit will be operated in Fife and Dundee for the remainder of 2006 and then de-commissioned in 2007. Angus Council will therefore seek to source an alternative set of analysers within Angus Council area.

196. The concentrations recorded by NO_2 diffusion tubes and the mobile automatic NO_X analyser since the last U&SA are below NAQS objectives. The requirement for new monitoring sites will be assessed during 2006.

197. PM_{10} monitoring will continue at the four Partisol sites to ensure a full year of monitoring is recorded at each site. Current PM_{10} concentrations at all four sites are predicted to be below the annual mean and 24-hour mean NAQS objective concentrations.

Conclusions and actions

198. It is concluded from the review and assessment of local emissions sources and air quality monitoring data that there is no potential for exceedence of the NAQS objectives for CO, benzene, 1,3-butadiene, lead, NO_2, SO_2 or PM_{10} within Angus Council area.

199. PM_{10} concentrations recorded by the Partisol analysers are significantly lower than the concentrations recorded by the TEOM analyser and it is intended to maintain the Partisol analyser sites and source a replacement to the groundhog mobile unit.

200. The next requirement for LAQM review and assessment is the 2007 Progress Report, which will be submitted to the Scottish Executive by the 30th April 2007.