

*North  
Wiltshire  
District  
Council*

*Improving North Wiltshire*



**APRIL 2006 UPDATING AND SCREENING**

**ASSESSMENT**

**OF**

**AIR QUALITY**

**IN**

**NORTH WILTSHIRE**



## **EXECUTIVE SUMMARY**

This report covers the Updating and Screening Assessment (USA) of air quality required by the Department for Environment Food and Rural Affairs (DEFRA) by the end of April 2006.

It builds upon the information collated in the 2004 and 2005 Progress reports submitted by the local authority, but also considers any significant changes in circumstances that may have occurred since that time.

The report focuses on relevant locations that will be susceptible to the most traffic congestion, highest traffic flows, but most of all where the highest pollution levels are most likely.

The USA concludes that there is no requirement to carry out a Detailed Assessment for any pollutant, at any location, in the district.

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## CHAPTER 1: Introduction

### 1.0 The role of review and assessment

1.1 The Air Quality Strategy establishes the framework for air quality improvements. Measures agreed at national and international level are the foundations on which the strategy is based. It is recognised, however, that despite these measures, areas of poor air quality will remain, and that these will best be dealt with using local measures implemented through the Local Air Quality Management (LAQM) regime.

1.2 The role of the local authority in the review and assessment process is to identify these areas, where it is considered likely that the Air Quality Objectives, included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002, will be exceeded.

The objectives for each pollutant are described in the ensuing chapters.

### 1.3 The Phased approach to review and assessment (R & A)

1.3.1 The relevant technical guidance for local authorities to follow is LAQM.TG (03) and this document builds upon the phased approach to review and assessment established in the previous technical guidance, LAQM.TG4 (00).

1.3.2 The intention is that local authorities should only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded.

1.3.3 During the first round of review and assessments, local authorities were required to carry out a three stage investigation of air quality within their District, with a fourth stage report required if exceedences were predicted. North Wiltshire District Council submitted a joint second and third stage report in December 2000, which concluded that no exceedences were likely and that no Air

Quality Management Areas (AQMA's) would need to be declared.

1.3.4 This step of this current round of review and assessment process is an Updating and Screening Assessment, which is to be undertaken by all authorities. This is based on a checklist approach to identify those matters that have changed since the previous round was completed, and which may now require further assessment.

1.3.5 The Updating and Screening Assessment takes account of new monitoring data; new objectives; new sources or significant changes to existing sources, either locally or in neighbouring authorities; and other changes that might affect air quality.

A simple screening assessment is then carried out if any significant changes are identified.

The USA checklists provided in LAQM.TG (03) have recently been revised and re-issued to take account of all necessary changes eg. relevant changes to public exposure.

1.3.6 If the Updating and Screening Assessment identifies a risk that an air quality objective will be exceeded at a location with relevant public exposure, the authority will be required to undertake a Detailed Assessment.

1.3.7 The Detailed Assessment is aimed at concluding with reasonable certainty whether or not a likely exceedence will occur. Where an exceedence is identified, then the assessment should be sufficiently detailed to determine both its magnitude and geographical extent. An Air Quality Management Area should not be declared unless a Detailed Assessment has been completed.

1.3.8 The previous Updating and Screening Assessment was completed by the end of May 2003, and concluded that no detailed assessment was necessary. Progress Reports were also submitted in 2004 and 2005, both reports concluding that no breaches of air quality objectives were substantiated.

#### 1.4 The District of North Wiltshire

- 1.4.1 The District of North Wiltshire covers 300 square miles and extends south from the upper reaches of the Thames Valley. It is bisected by the Avon Valleys which run through the District from North to South. Swindon lies adjacent to the north-east boundary and Bath to the south-west.
- 1.4.2 Sections of the southern part of the Cotswold Area of Outstanding Natural Beauty (AONB) fall within the west of the District, with parts of the North Wessex Downs AONB to the east.
- 1.4.3 Over half the total population of 125,000 live in the six main towns of the District. The largest, Chippenham, has a population of over 33,030 and is expanding fast. The other towns are Calne (13,030); Corsham (10,970); Wootton Bassett (11,120); Cricklade (4,240) and Malmesbury (5,420) residents.
- 1.4.4 The District is crossed by both the M4 motorway and the railway from London to Bristol and South Wales. The M4 motorway, which crosses the centre of the District, has junctions to the north of Chippenham and just west of Swindon. The London and Swindon to Bath and Bristol railway line parallels the motorway and has a station at Chippenham well served by high-speed trains.
- 1.4.5 The District retains its economic prosperity and continues to draw new industries, largely to the industrial sites being developed at Chippenham, Calne and Wootton Bassett.

## The District of North Wiltshire



## CHAPTER 2: Review and Assessment of Carbon Monoxide (CO)

### 2.1 Introduction

- 2.1.1. A maximum daily running 8 hour mean concentration of 10 mg/m<sup>3</sup> has been set as the air quality standard for carbon monoxide, to be achieved by the end of 2003.
- 2.1.2. The main source of carbon monoxide in the United Kingdom is road transport, which accounted for 67% of emissions in 2000. Annual emissions have been falling steadily since the 1970's with current projections indicating that road transport emissions will decline by a further 42% between 2000 and 2005.
- 2.1.3. Carbon monoxide concentrations adjacent to major roads have been modelled at national level suggesting that existing policies will be sufficient to reduce concentrations to below the objective.

### 2.2 Updating and Screening Assessment (USA) for Carbon Monoxide

- 2.2.1 Local Authorities should draw upon the information compiled as part of the Progress Reports submitted in 2004 and 2005, as well as any new information in the checklist below.
- 2.2.2 The USA for Carbon Monoxide should be based on a checklist approach for each source or location as set out below:
- Monitoring data
  - Very busy roads or junctions in built-up areas

## 2.3 Monitoring data

2.3.1 In terms of monitoring data, as detailed in the 2003 USA, the Local Authority had monitored from 1997 to 1999 at relevant locations within the district. This monitoring included junctions in built-up areas. (See below).

2.3.2 As concentrations were well below the objective and there has been no change in circumstances, there has been no further monitoring for Carbon Monoxide.

## 2.4 Very busy roads or junctions in built-up areas

2.4.1 The criteria for 'very busy' roads is specified in Box 2.2 of the Technical Guidance as:

- Single carriageway roads with annual average daily traffic flows (AADT's) of greater than 80,000 vehicles.
- Dual carriageway (2 or 3 lane) roads exceeding an AADT of 120,000 vehicles.
- Motorways with AADT's in excess of 140,000 vehicles.

2.4.2 Consultation with Wiltshire County Council Transport Planners has confirmed that there are no roads exceeding the above criteria, as was the case in the 2003 USA.

## 2.5 USA Conclusions for Carbon Monoxide

2.5.1 No further monitoring has been necessary for Carbon Monoxide in North Wiltshire.

2.5.2 There are no roads in North Wiltshire that exceed the 'very busy' road criteria for further investigation.

2.5.3 This chapter demonstrates that there is no requirement for a detailed assessment for carbon monoxide.

## CHAPTER 3: Review and Assessment of Benzene

### 3.1 Introduction

3.1.1 A running annual mean concentration of  $16.25 \text{ ug/m}^3$  has been set as the air quality standard for benzene, with an objective for the standard to be achieved by the end of 2003. However, in the light of health advice from various bodies, to reduce concentrations of benzene in air to as low a level as possible, an additional tighter objective of  $5 \text{ ug/m}^3$  by 2010 has been set for England and Wales.

3.1.2 The main sources of benzene emissions in the UK are petrol-engined vehicles, petrol refining, and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems.

3.1.3 First round reviews and assessments have proven that there is no requirement for authorities to consider road traffic emission for the 2003 objective. Only those authorities with relevant locations in the vicinity of major industrial processes that store, handle or emit benzene, will need to progress beyond the USA for the 2003 objective.

3.1.4 Data collected during the first round of reviews and assessments has indicated that the 2010 objective may be at risk at locations in close vicinity to petrochemical processes and large petrol stations adjacent to busy roads.

### 3.2 The Updating and Screening Assessment (USA) for Benzene

3.2.1 Local authorities should draw upon the information compiled as part of the Progress Reports submitted in 2004 and 2005, as well as any new information in the checklist below.

3.2.2 The USA for benzene should be based on a checklist approach for each source or location as set out below:

- Monitoring data (outside or within an AQMA)
- Very busy roads or junctions in built-up areas.
- Industrial Sources (new or existing with increased emissions or new relevant exposure)
- Petrol Stations.
- Major fuel storage depots (petroleum only).

### 3.3 Monitoring Data

3.3.1 Monitoring data was collected during the first stage of review and assessment using diffusion tubes positioned kerbside at a busy road and a petrol station boundary in both Chippenham and Calne.

3.3.2 This was reported in the 2003 USA and it has not been necessary to carry out any further monitoring for Benzene in North Wiltshire as there have been no changes in circumstances.

### 3.4 Road Traffic Sources

3.4.1 Box 3.2 of the Technical Guidance says that for road traffic assessments will be required when the 2010 background is expected to be greater than 2  $\mu\text{g}/\text{m}^3$  due to 'very busy' roads.

This is defined as:-

- Single carriageway roads with annual average daily traffic flows (AADT) exceeding 80,000 vehicles per day.
  - Dual carriageway (2 or 3 lane) roads exceeding an AADT of 120,000 vehicles.
  - Motorways exceeding an AADT of 140,000.

3.4.2 Consultation with Wiltshire County Council has confirmed that there are no roads in North Wiltshire exceeding the above criteria, as was the case in the 2003 USA.

### 3.5 Industrial Sources

3.5.1 Annex 2 of the Technical Guidance lists industrial processes with the potential to emit significant quantities of benzene.

3.5.2 As was the case in the 2003 USA, there are no such processes in North Wiltshire and consultation with neighbouring authorities has also not identified any such processes. It therefore follows that there are no substantially increased emissions or new relevant exposure.

### 3.6 Other sources

3.6.1 There is some evidence that petrol stations will emit sufficient benzene to put the 2010 objective at risk, especially if combined with higher levels from busy roads.

3.6.2 The 2003 USA did not identify any relevant locations that would meet the criteria and there have been no changes in circumstances since that time.

3.6.3 There are no major fuel storage depots (petrol) in North Wiltshire.

### 3.7 USA Conclusions for Benzene

3.7.1 This chapter demonstrates that neither the 2003 or 2010 objectives for Benzene are at risk and as such a detailed assessment is not required.

## CHAPTER 4: Review and Assessment of 1, 3 – butadiene

### 4.1 Introduction

4.1.1 A maximum running annual mean concentration of 2.25 ug/m<sup>3</sup> has been adopted as an air quality standard for 1,3-butadiene, with the objective to be achieved by the end of 2003.

4.1.2 The main source of 1,3-butadiene in the United Kingdom is emissions from motor vehicle exhausts, although it is also an important industrial chemical and is handled in bulk at a small number of industrial premises.

4.1.3 The increasing number of vehicles equipped with three way catalysts, agreed reductions in vehicle emissions and improvements in fuel quality are expected to have reduced emissions from vehicle exhausts whereby the objective will be delivered.

4.1.4 Only those authorities with relevant locations in the vicinity of major industrial processes which handle, store or emit 1,3-butadiene, are expected to proceed beyond the USA.

### 4.2 The Updating and Screening Assessment (USA) for 1,3-butadiene

4.2.1 Local authorities should draw upon the information compiled as part of the Progress Reports submitted in 2004 and 2005, as well as any new information in the checklist below.

4.2.2 The USA for 1,3-butadiene should be based on a checklist approach for each source or location as set out below:-

- Monitoring Data
- New industrial sources
- Existing industrial sources with significantly increased emissions, or new relevant exposure.

### 4.3 Monitoring Data

4.3.1 Whilst North Wiltshire have never carried out any monitoring for 1,3-butadiene, there have been no changes in circumstances since the 2003 USA to require such monitoring.

### 4.4 Industrial Sources

4.4.1 There is no information to suggest that there are new industrial sources or sources with increased emissions either within or adjacent to North Wiltshire that would give rise to exceedences of the 1, 3-butadiene objective. Relevant exposure to such sources is therefore not an issue.

### 4.5 USA Conclusions for 1, 3-butadiene

4.5.1 This chapter demonstrates that 2003 objective for 1, 3-butadiene is still not at risk and as such a detailed assessment is not required.

## CHAPTER 5: Review and Assessment of Lead

### 5.1 Introduction

5.1.1 An annual mean concentration of 0.5 ug/m<sup>3</sup> has been adopted as the air quality standard for lead, with an objective for the standard to be achieved by the end of 2004. A lower objective of 0.25 ug/m<sup>3</sup>, to be achieved by the end of 2008 has also been set.

5.1.2 Since the ban on sales of leaded petrol was imposed in 2000 in the United Kingdom, the main source of lead in the environment is restricted to industries involving battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping.

### 5.2 Updating and Screening Assessment (USA) for Lead

5.2.1 Local Authorities are encouraged to maximise and build upon the information collated during the first round of review and assessment, as well as identifying any significant changes since that time.

5.2.2 The USA for lead should be based on a checklist approach for each source or location as set out below:

- Monitoring data
- New industrial sources
- Industrial sources with substantially increased emissions, or new relevant exposure.

### 5.3 Monitoring data

5.3.1 North Wiltshire have no monitoring data for Lead, nor have there been any changes in circumstances since the 2003 USA that would require such monitoring.

#### 5.4 New or increased industrial sources

5.4.1 No industrial sources were identified locally during the first round of Review and Assessment as likely to give rise to exceedences of the annual mean objective for lead.

5.4.2 Box 5.1(B) of the Technical Guidance acknowledges this, however recommends that authorities determine whether new processes have moved into their district or neighbouring authorities with the potential to emit significant quantities of lead.

5.4.3 No such sources have been identified, nor existing sources who have increased lead emissions by > 30%, as Box 5.1 (C) advises.

#### 5.5 USA Conclusions for Lead

5.5.1 This chapter demonstrates that there is no requirement to carry out a detailed assessment for lead.

## CHAPTER 6: Review and assessment of Nitrogen dioxide

### 6.1 Introduction

- 6.1.1 Two air quality objectives have been adopted for nitrogen dioxide, an annual mean concentration of  $40 \text{ ug/m}^3$  and a 1 hour mean concentration of  $200 \text{ ug/m}^3$  not to be exceeded more than 18 times per year. The objectives are to be achieved by the end of 2005.
- 6.1.2 The first Air Quality Daughter Directive also sets the same limits to be achieved by 1<sup>st</sup> January 2010.
- 6.1.3 Nitrogen dioxide ( $\text{NO}_2$ ) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides ( $\text{NO}_x$ ). All combustion processes produce  $\text{NO}_x$  emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health.
- 6.1.4 The principal source of nitrogen oxides emissions is road transport which accounted for about 49% of total UK emissions in 2000. Major roads carrying large volumes of high-speed traffic (such as motorways and other primary routes) are a predominant source, as are conurbations and city centres with congested traffic.
- 6.1.5 The contribution of road transport to nitrogen oxides emissions has declined significantly in recent years as a result of various policy measures and urban traffic  $\text{NO}_x$  emissions are estimated to fall by about 20% between 2000 and 2005, and by 46% between 2000 and 2010.
- 6.1.6 Other significant sources of  $\text{NO}_x$  emissions include the electricity supply industry and other industrial and commercial sectors, which accounted for about 24% and 23% respectively in 1999. As with the transport sector, emissions from these sources are declining as technology improves.

- 6.1.7 Nationally, the first round of review and assessments predicted exceedences in the vicinity of major airports, where both road traffic and aircraft NO<sub>x</sub> emissions combine. Whilst industrial sources may make a contribution to local pollutant levels, no exceedences of the objectives have been identified as a direct result of these emissions above.
- 6.1.8 An analysis of monitoring data in the vicinity of roads throughout the UK has been undertaken by Air Quality Consultants and the University of the West of England on behalf of DEFRA, and provided useful guidance to authorities on where exceedences might occur. The report concludes that, outside of major conurbations, exceedences of the annual mean objective are only likely to occur within about 10 metres of the kerbside of single carriageway roads. This includes roads with fairly low traffic flows (10,000 – 20,000 vehicles/day) if they are within congested town centres. This conclusion is particularly significant, as many market towns have narrow streets, with residential properties within 5 metres of the kerb.
- 6.1.9 This chapter will therefore focus on areas where traffic is most congested in the towns of the district and where the traffic flows are the highest, but most of all where pollution levels and public exposure are most critical.

## 6.2 Updating and Screening Assessment (USA) for Nitrogen dioxide

- 6.2.1 This updating review is intended to identify any significant changes that may have occurred since the Progress Reports submitted in 2004 and 2005, as well as new information in the checklist below.
- 6.2.2 The USA for NO<sub>2</sub> should be based on a checklist approach for each source or location as set out below:
- Monitoring data within or outside an AQMA.
  - Narrow congested streets with residential properties close to the kerb.

- Junctions.
- Busy streets where people may spend 1 hour or more close to traffic.
- Roads with high flows of buses and/or HGV's.
- New roads constructed or proposed since the previous round of R & A.
- Roads with significantly changed traffic flows, or new relevant exposure.
- Bus Stations.
- New industrial sources.
- Industrial sources with substantially increased emissions, or new relevant exposure.
- Aircraft.

### 6.3 Monitoring data

- 6.3.1 Whilst no AQMA's have been declared, historically, North Wiltshire District Council have gathered a lot of data in respect of NO<sub>2</sub> levels across the district. This has been in the form of passive diffusion tubes, self-contained mobile monitoring unit for one month and automatic monitoring.
- 6.3.2 Table 1 shows the results of 2005 NO<sub>2</sub> diffusion tube monitoring for all sites in North Wiltshire. Concentrations have been bias corrected using a factor of 1.1, obtained from the Review and Assessment helpdesk. (See figure 1). It can be seen that all concentrations are well below the 2005 annual mean objective of 40ug/m<sup>3</sup>. The data is portrayed in graphical format in Figure 2.
- 6.3.3 A traffic-calming scheme was introduced in Calne town centre during April 2005, and it can be seen to have no significant effect in the Wood Street, Calne data. Five year trends for North Wiltshire tubes were reported in the Progress Report of April 2005. (See Fig. 3 for updated graph).
- 6.3.4 Table 2 shows the results for the former UK National Network survey sites. Annual trends for 10 years (1995 to 2004) were also reported in the Progress Report submitted in April 2005.

- 6.3.5 All previous monitoring has been focussed on relevant locations. As stated in the 2003 USA, the Local Authority feel that the Bridge Centre, Bath Road, Chippenham site is probably 'worst case' scenario, in terms of traffic flows meeting at one point.
- 6.3.6 An automatic monitoring exercise was therefore arranged at this location for NO<sub>2</sub> and PM<sub>10</sub> from November 2005 to February 2006, covering approximately 12 weeks.
- 6.3.7 The study adopted the same rationale as previous exercises in North Wiltshire, i.e. the data is analysed and assessed by Air Quality Consultants. The report can be seen in Appendix 1. Neither the 1-hour, nor the annual mean objectives for Nitrogen Dioxide were exceeded, although the annual mean was predicted to be achieved by a relatively small margin i.e. 39 ug/m<sup>3</sup>.
- 6.3.8 The diffusion tube result for this study area (Table 1), however shows that the annual mean for 2005 was 31 ug/m<sup>3</sup> and this is more relevant to "public exposure" in terms of the annual mean as the tube is approximately 8 metres away from the road, whereas the unit was within 1 - 2 metres.

#### 6.4 Narrow congested streets with residential properties close to the kerb

- 6.4.1. All previous monitoring exercises have encompassed areas where traffic is slow moving with stop/start driving and where buildings either side reduce dispersion.
- 6.4.2. These types of location will therefore require no further consideration.

#### 6.5 Junctions

- 6.5.1 The Bridge Centre, Chippenham study above is the junction between the A4 and the A420 in the centre of Chippenham and so the Local Authority feel that junctions have been subject to sufficient scrutiny.

## 6.6 Busy Streets where people may spend 1 hour or more close to traffic

6.6.1 These types of location were specifically included during the first round of review and assessment. e.g. High Street, Wootton Bassett and Curzon Street, Calne, whilst Chippenham, our largest town is pedestrianised. There have been no changes in circumstances since that time.

## 6.7 Roads with high flows of buses and/or HGV's

6.7.1 Section F of Box 6.2 in the Technical Guidance defines an 'unusually high' proportion of heavy duty vehicles as > 25% of traffic flow.

6.7.2 Information provided by Wiltshire County Council transport planners identifies no such roads.

## 6.8 New roads constructed or proposed since the previous round of review and assessment

6.8.1 No such roads have been identified for consideration.

## 6.9 Roads with significantly changed traffic flows, or new relevant exposure

6.9.1 Section H of Box 6.2 requires that the local authority identifies any roads with more than 10,000 vehicles per day that have experienced more than a 25% increased in traffic flow.

6.9.2 No roads in North Wiltshire are considered to fall into this category and as such no further investigation is required.

## 6.10 Bus Stations

6.10.1 There have been no changes in circumstances since the 2003 USA and as such no further investigation of bus stations is considered necessary.

## 6.11 Industrial Sources

6.11.1 No significant new industrial sources have been located in North Wiltshire or neighbouring authorities since the Progress Reports of 2004 and 2005.

## 6.12 Industrial sources with substantially increased emissions, or new relevant exposure

6.12.1 As no industrial sources were identified during the previous round of review and assessment, and there have been no changes in circumstances, no further investigation is required.

## 6.13 Aircraft

6.13.1 RAF Lyneham has been previously assessed in 1999 for NO<sub>2</sub> with the mobile monitoring unit demonstrating at a relevant location (Chippenham Road, Lyneham) that the objectives were not being breached.

## 6.14 USA conclusions for Nitrogen dioxide

6.14.1 A robust monitoring strategy at carefully chosen relevant locations where public exposure to the highest concentrations of traffic related NO<sub>2</sub> has demonstrated that the objectives will comfortably be met in North Wiltshire.

6.14.2 There have been no significant changes with regard to other potential sources of NO<sub>2</sub>.

6.14.3 This chapter demonstrates that there is no requirement to carry out a detailed assessment for NO<sub>2</sub>.

## CHAPTER 7: Review and Assessment of Sulphur Dioxide

### 7.1 Introduction

7.1.1 A 15-minute mean of  $266 \text{ ug/m}^3$  has been adopted as an air quality standard for sulphur dioxide, with an objective for the standard not to be exceeded more than 35 times in a year by the end of 2005. Additional objectives have been set which are equivalent to the EU limit values specified in the First Air Quality Directive. These are for a 1 hour mean objective of  $350 \text{ ug/m}^3$ , to be exceeded no more than 24 times per year, and a 24 hour objective of  $125 \text{ ug/m}^3$ , to be exceeded no more than 3 times per year, to be achieved by the end of 2004.

7.1.2 The main source of sulphur dioxide in the United Kingdom is power stations, which accounted for more than 71% of emissions in 2000. Domestic sources now only account for 4% of emissions, but can be locally much more significant. Road transport currently accounts for less than 1% of emissions.

7.1.3 Local exceedences of the objectives (mainly the 15-minute mean objective) may occur in the vicinity of small combustion plant (less than 20 MW) which burn coal or oil, in areas where solid fuels are the predominant form of domestic heating, and in the vicinity of major ports.

### 7.2 Updating and Screening Assessment (USA) for Sulphur Dioxide (SO<sub>2</sub>)

7.2.1 Local authorities are encouraged to maximise and build upon the data and assessment work completed during the first round of review and assessment, as well as identifying any changes in circumstances.

7.2.2 The USA for sulphur dioxide should be based on a checklist approach for each source or location as set out below:

- Monitoring data within or outside an AQMA.
- New industrial sources.
- Industrial sources with substantially increased emissions, or new relevant exposure.
- Areas of domestic coal burning.
- Small boilers (>5MW<sub>(thermal)</sub>) burning coal or oil.
- Shipping.
- Railway locomotives.

### 7.3 Monitoring data

- 7.3.1 Whilst no AQMA's have been declared, monitoring data was collated during the first round of review and assessment at roadside locations in the six main towns of the District, using the self-contained mobile unit as previously outlined in earlier chapters.
- 7.3.2 The locations were originally selected with road transport as the focus, but it was concluded that any significant emissions from local industry should also be reflected in the monitoring. These studies concluded that the data obtained in 1997 and 1998 would in no way breach the objectives.
- 7.3.3 Sulphur Dioxide (SO<sub>2</sub>) diffusion tubes have been sited at key locations around the 'edge' of the district in the last year. These are not necessarily with a view to proving compliance with the air quality objectives, but to portray any impact from the proposal to burn Recycled Liquid Fuel (RLF) at Lafarge in Westbury. This proposal has been postponed, however the tubes will provide valuable background data should there be a change in circumstances. (See Table 3 for results).

#### 7.4 New industrial sources

7.4.1 No new industrial sources have been identified within North Wiltshire or neighbouring authorities, that are likely to produce significant quantities of SO<sub>2</sub>.

#### 7.5 Industrial sources with substantially increased emissions, or new relevant exposure

7.5.1 No industrial sources with substantially increased (>30%) emissions of SO<sub>2</sub> have been identified either within North Wiltshire or in neighbouring authorities.

#### 7.6 Areas of domestic coal burning

7.6.1 The 2003 USA examined this situation and there have been no changes in circumstances since that time.

#### 7.7 Small boilers >5MW<sub>(thermal)</sub>

7.7.1 No boiler plant >5MW<sub>(thermal)</sub> that burn coal or fuel oil have been identified within the district.

#### 7.8 Shipping

7.8.1 There are no shipping sources in the district of North Wiltshire.

#### 7.9 Railway Locomotives

7.9.1 No locations have been identified within the district whereby diesel locomotives are regularly stationary for periods of 15 minutes or more as detailed in section H of the Technical Guidance.

## 7.10 USA Conclusions for Sulphur Dioxide

7.10.1 Monitoring data within North Wiltshire have previously demonstrated that the objectives for SO<sub>2</sub> will be comfortably met.

7.10.2 No sources have been identified since the first round of review and assessment that would produce breaches of the SO<sub>2</sub> objectives.

7.10.3 This chapter demonstrates that there is no requirement to carry out a detailed assessment for SO<sub>2</sub>.

## 8.1 Introduction

8.1.1 Two air quality objectives have been adopted for fine particles (PM<sub>10</sub>), which are equivalent to the EU Stage 1 limit values in the first Air Quality Daughter Directive. The objectives are 40 ug/m<sup>3</sup> as the annual mean, and 50 ug/m<sup>3</sup> as the fixed 24 hour mean to be exceeded on no more than 35 days per year, to be achieved by the end of 2004. The objectives are based upon measurements carried out using the European gravimetric transfer reference sampler or equivalent.

8.1.2 There is a wide range of emission sources that contribute to PM<sub>10</sub> concentrations in the UK. These sources can be usefully divided into 3 main categories:

- Primary particles – emissions derived directly from combustion sources, including road traffic, power generation, industrial processes etc.
- Secondary particles – particles formed by chemical reactions in the atmosphere, and comprise principally of sulphates and nitrates.
- Coarse particles – these comprise of emissions from a wide range of sources, including resuspended dusts from road traffic, constructions works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles.

8.1.3 It is important to bear in mind the different emissions sources, and their respective contributions to PM<sub>10</sub> concentrations, within the review and assessment process for the following reasons:

- The expected reduction in particle emissions in future years is different for each source type e.g. emissions from road transport will be governed by new legislation on vehicle emissions standards.

- Emissions of secondary particles will be largely governed by controls on power generation, industrial and transport SO<sub>2</sub> and NO<sub>x</sub> emissions, both in the UK and in Europe.
- Emissions of coarse particles are largely uncontrolled, and in general are not expected to decline in future years.

8.1.4 In forecasting future emissions it is therefore essential to treat each source category separately.

8.1.5 The principal focus of Local Air Quality Management should be towards the control of emissions at 'local' level. It is therefore important that the review and assessment process identifies the contribution of local emission sources, so that the effectiveness of control policies or action plans can be evaluated.

8.1.6 A significant proportion of current annual mean background PM<sub>10</sub> concentrations is derived from regional (including long distance transport from Europe) background sources. Typical regional annual mean background contributions are currently within the range 14-21 ug/m<sup>3</sup> gravimetric, and are outside of the control of local authorities. Where exceedences of the proposed objectives are predicted, local authorities are strongly advised to focus their efforts on the identification of the contribution of local sources to overall PM<sub>10</sub> concentrations.

8.1.7 There has been significant progress in recent years in reducing emissions of particles from both the transport and industrial sectors, and total national annual UK emissions declined by nearly 40% in the period between 1990 and 1999. Further reductions are expected in future years as a result of agreed additional policies, or those that are currently under discussion.

8.1.8 Within the industrial sector, particle emissions will be further controlled through the EU Directive on Integrated Pollution Prevention and Control (IPPC) and the EU Waste Incineration Directive. In addition, a significant reduction in emission of pollutants that lead to the formation of secondary particles is expected as a result of the EU legislation on the Acidification Strategy. Emissions from

road transport will also be reduced as a result of tightening emissions controls and by the reduction of the sulphur content of diesel fuel, which affects the emissions of particles from vehicles.

8.1.9 Concentrations of PM<sub>10</sub> are currently measured at more than 60 national network monitoring sites in the UK. They are shown in Table 8.1 of the Technical Guidance for the period 1999 to 2001. Concentrations are generally well below the 2004 annual mean objective (40 ug/m<sup>3</sup> gravimetric) with the exception of the London Marylebone Road kerbside site. The 24 hour objective for 2004 (50 ug/m<sup>3</sup>, maximum of 35 exceedences per year) has been exceeded at a small number of sites, mainly those in the vicinity of busy roads or close to industrial activities.

8.1.10 The data above still requires projecting to 2004 and when this is carried out, the analysis has indicated that exceedences of the 2004 objectives might be found in the following areas:

- Urban background sites in central London.
- Areas adjacent to busy roads, particularly within major urban areas.
- Areas which have significant emissions from the domestic burning of solid fuels.
- Areas in the vicinity of industrial plant, or which have significant uncontrolled or fugitive emissions (for example, quarrying, materials handling facilities etc).

## 8.2 Updating and Screening Assessment (USA) for PM<sub>10</sub>

8.2.1 This updating review is intended to identify any significant changes that may have occurred since the previous round of review and assessment was completed.

8.2.2 Authorities are encouraged to maximise and build upon the information in the Progress Reports submitted in 2004 and 2005, as well as any new information in the checklist below.

8.2.3 The USA for PM<sub>10</sub> should be based on a checklist approach for each source or location as set out below:

- Monitoring data within or outside an AQMA
- Junctions
- Roads with high flow of buses and/or HGV's
- New roads constructed or proposed since last round of R & A.
- Roads with significantly changed traffic flows or new relevant exposure
- Roads close to the objective during the second round of R & A.
- New industrial sources
- Industrial sources with substantially increased emissions or new relevant exposure.
  - Areas with domestic solid fuel burning
  - Quarries, landfill sites, open cast coal, handling of dusty cargoes at ports etc.
  - Aircraft

### 8.3 Monitoring data within or outside an AQMA

8.3.1 Whilst North Wiltshire District Council have never declared an AQMA, the local authority have carried out air quality monitoring as outlined in the previous chapters, with a view to highlighting 'hotspots' for further investigation.

8.3.2 In the case of PM<sub>10</sub>, this involved using the mobile monitoring station to provide real time data for one month, at either roadside locations, or sites susceptible to fugitive emissions or dust from nearby activities. Previous studies have produced no exceedences of either the annual mean nor the 24-hour objective.

8.3.3 As explained in Paragraphs 6.3.6 and 6.3.7, an automatic monitoring exercise (NO<sub>2</sub> and PM<sub>10</sub>) was arranged at the Bridge Centre, Bath Road, Chippenham for approximately 12 weeks from November 2005 to February 2006.

8.3.4 This monitoring concluded that the statutory objectives for PM<sub>10</sub> are likely to be achieved by a very substantial margin. (See Appendix 1 for full report).

#### 8.4 Junctions

8.4.1 For the reasons given in section 6.5.1 of this report there is no need to consider junctions any further.

#### 8.5 Roads with high flow of buses and/or HGV's

8.5.1 There are no roads in North Wiltshire, according to information provided by Wiltshire County Council, that exceed 20% of the AADT, which is the figure deemed to be an 'unusually high' proportion in the Technical Guidance.

#### 8.6 New roads constructed or proposed since first round

8.6.1 No such roads have been identified for consideration

#### 8.7 Roads with significantly changed traffic flows, or new relevant exposure

8.7.1 The Technical Guidance defines a significant change as greater than 25% in AADT traffic flow. No such roads have been identified as having such an increase following consultation with Wiltshire County Council.

#### 8.8 Roads close to the objective during the second round of R & A

8.8.1 No roads have been identified where more than 30 exceedences of the 24 hour objective were predicted at relevant locations during the previous round, and as such no further investigation is necessary.

## 8.9 New industrial sources

8.9.1 No significant new industrial sources have been located in North Wiltshire or neighbouring authorities, since the previous round of review and assessment.

## 8.10 Industrial sources with substantially increased emissions, or new relevant exposure

8.10.1 No industrial sources were identified as potentially significant in the last round, and no circumstances have changed, therefore no further investigation is required.

## 8.11 Areas of domestic solid fuel burning

8.11.1 No areas of domestic coal burning were identified in the 2003 USA and there have been no changes in circumstances since that time.

## 8.12 Quarries/landfill sites/opencast coal/handling of dusty cargoes at ports etc

8.12.1 The local authority is satisfied that during second stage review and assessment, the monitoring in Gosditch, Ashton Keynes reflected a relevant location near (approx. 300m) to the most likely sources of fugitive sources of PM<sub>10</sub> in the district. i.e. gravel extraction, concrete batching. There have been no changes in circumstances since that time to suggest that further investigations are required.

## 8.13 Aircraft

8.13.1 The local authority has monitored on several occasions in the flight-path of RAF Lyneham, proving that there will be no breach of the 2004 objectives.

#### 8.14 USA conclusions for PM<sub>10</sub>

8.14.1 All monitoring at carefully chosen relevant locations has not identified any likely breaches of the 2004 objectives.

8.14.2 There have been no significant changes with regards to other potential sources of PM<sub>10</sub>.

8.14.3 This chapter demonstrates that there is no requirement to carry out a detailed assessment of PM<sub>10</sub>.

## GLOSSARY OF TERMS AND ABBREVIATIONS

| <u>Term</u>       | <u>Description</u>   |
|-------------------|--|
| AADT              | - Annual average daily traffic flow  |
| AQMA              | - Air Quality Management Area  |
| AQS               | - Air Quality Strategy   |
| Chemiluminescence | - The emission of absorbed energy as light during a chemical reaction. The measurement of the light emitted can give a measure of the concentration of one of the reactants if the other one is known. |
| CO                | - Carbon Monoxide – a gaseous pollutant formed during incomplete combustion of carbonaceous fuel.  |
| (grav.)           | - Gravimetric method of weighing particulate matter on a filter  |
| m <sup>3</sup>    | - Unit of volume cubic metre = 1000 litre  |
| mg/m <sup>3</sup> | - Milligrams per cubic metre   |
| NO                | - Nitric Oxide   |
| NO <sub>2</sub>   | - Nitrogen Dioxide   |
| NO <sub>x</sub>   | - Oxides of Nitrogen   |
| PM <sub>10</sub>  | - Particulate matter less than 10µm aerodynamic diameter   |
| SO <sub>2</sub>   | - Sulphur Dioxide  |
| µg                | - Microgram millionth (10 <sup>-6</sup> ) of a gram<br>- Micrograms per cubic metre – a unit of concentrations (1 millionth of a gram of pollutant per cubic meter of air)                             |
| Kerbside          | - A site sampling within 1m of the edge of a busy road.  |
| Roadside          | - A site sampling within 1 – 5m of a busy road.  |
| Urban background  | - An urban location distanced from sources and therefore broadly representative of city-wide background conditions e.g. urban residential areas.   |