AIR QUALITY UPDATING AND SCREENING ASSESSMENT 2006

LOCAL AIR QUALITY

UPDATING AND SCREENING ASSESSMENT OF AIR QUALITY

DOWN DISTRICT COUNCIL

ENVIRONMENTAL HEALTH

2006

Index

TABLES

FIGURES

Executive Summary

The aim of this Updating and Screening Assessment (USA) of air quality in Down District Council is to identify matters that have changed since the first review and assessment which might lead to a risk of an air quality objective (appendix 1) being exceeded. The USA was carried out according to Local Air Quality Management Policy Guidance LAQM.TG(03). The assessment looked at seven pollutants and no detailed assessments are required.

1.0 INTRODUCTION

The Environment (Northern Ireland) Order 2002 and subsequent regulations introduced the framework of Local Air Quality Management to Northern Ireland, requiring every local authority to periodically review air quality in its area. This updating and screening assessment (USA) is conducted in order to assess whether the prescribed standards and objectives set out in the National Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000, the Air Quality Regulations 2000 and the Air Quality Regulations (Northern Ireland) Amendment Regulations 2003 are likely to be achieved.

All enquiries regarding this updating and screening assessment should be made to:

Environmental Health Service
Down District Council
24 Strangford Road
Downpatrick
(028) 4461 0800
env.health@downdc.gov.uk

1.1 NATIONAL AIR QUALITY STRATEGY

Traditionally District Councils have had statutory responsibility for dealing with the abatement of air pollution problems that could be attributed to a single premise, through the use of Public Health legislation. This was ineffective against general smog and smoke and the chronic health effects of such an environment abounded until the 1950s and 60s. The Clean Air (NI) Order 1981 enabled District Councils to deal pro-actively with problem areas by designating *Smoke Control Areas*. More recently the Industrial Pollution Control Order 1997 enables District Councils to deal pro-actively with air pollution from certain prescribed industrial processes.

It is recognised that air pollution migrates and may have effects distant from the source; therefore a premises based approach is not the whole solution to effective pollution control. In addition, it is now recognised that motor traffic contributes significantly to air pollution. It is difficult to legally control this pollution source since limiting individual vehicle emissions can be undermined by traffic volume and congestion on roads. Air pollution is still identified as a factor in ill health and public awareness of air pollution issues has increased.

In recognition of the requirement for a strategic approach with a local emphasis, the Government published in 1997 a National Air Quality Strategy (NAQS) which is founded on Air Quality Standards and objectives (see appendix 1) for eight pollutants to be achieved by around 2005. These pollutants are benzene, 1,3 Butadiene, Carbon Monoxide, Lead, Nitrogen Dioxide, Fine Particles (PM_{10}), Sulphur Dioxide and Ozone. Ozone is not included in this process due to the significant transboundary nature of the pollutant, and the limited direct influence that local authorities therefore have in achieving local standards.

1.2 Local Air Quality Management

The National Air Quality Strategy guidance recommends a phased approach involving three stages. Councils are tasked with assessing industrial, transport and any other sources of pollutants, which have the potential for significant impacts within their boundaries. This assessment is to be undertaken at three levels: -

- First Stage- a preliminary assessment of sources of industrial, transport and domestic air pollution in relation to risk of exposure to individuals to levels that exceed the prescribed limits. For each of the designated pollutants, where the risk of this occurring is not negligible, the assessment should be progressed to the second stage of the review.

- Second Stage- a further assessment of the pollutants identified in stage one of the review, involving estimation, modelling or measurement to predict pollutant concentrations by the given deadlines for compliance with the national objectives. For each pollutant, where there is risk of the objectives being exceeded the air quality review should be progressed to the third stage.

- Third Stage- the use of modelling, monitoring and emission inventories to predict whether the objectives will be exceeded. Where this is likely the Council should designate the affected area as an Air Quality Management Area (AQMA).

The first air quality review and assessment in Down District Council was carried out in 2000. Results showed the air quality objectives were likely to be achieved by the relevant deadline in all areas of the local authority (table 1). As a result no Air Quality Management Areas were required in Down District Council.

The timetable for review and assessment of air quality has been outlined in 'Progress Report Guidance' (LAQM. PRGNI (04) issued by the Environment and Heritage Service in November 2004. Local authorities are required to carry out an Updating Screening and

Assessment (USA) of air quality in their area with a report due for completion by the end of April 2006. If screening shows potential problems, a detailed assessment will be completed by the end of April 2007.

The reviews will follow a similar phased approach to the first round of review and assessments as described below:

Stage 1: This is an Updating and Screening Assessment, which will identify matters that have changed since the last review and assessment, which might lead to a risk of an air quality objective being exceeded.

Stage 2: This is a Detailed Assessment, which will provide an accurate assessment of the likelihood of an air quality objective being exceeded at locations with relevant exposure and would be due in April 2007.

TABLE 1 – Air Quality objectives

Pollutant	**Assessment** **Stage 1** **Potential exceedances**	**Final Report** **Exceedance identified**
Benzene	NO	NO
1,3 Butadiene	NO	NO
Carbon Monoxide	NO	NO
Lead	NO	NO
Nitrogen Dioxide	YES	NO
Fine Particle (PM_{10})	YES	NO
Sulphur dioxide	YES	NO

1.3 DESCRIPTION OF DOWN DISTRICT COUNCIL

Down District Council comprises a largely rural area of around 65,000 hectares in the south east of Northern Ireland, with a population of some 66,000 (table 2).

Table 2 Population projections for Down District Council 2002- 2010 (**www.nisra.gov.uk**, accessed 25th April 2006)

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Pop	64,836	65,419	65,848	66,285	66,749	67,220	67,704	68,189	68,692

The table shows sustained population growth for Down District Council area.
The main centres of population are located in Downpatrick, Newcastle and Ballynahinch. Agriculture and tourism form by far the most significant economic base in the area, with relatively little heavy industry. The Irish Sea and the inlet to Strangford Lough form a natural boundary for the south and east of the District. Much of this boundary has Area of Special Scientific Interest (ASSI) status. To the south of the District are the Mourne Mountains which are to form the centre of Northern Ireland's first National Park. The Draft Ards and Down Area Plan prepared under Part III of the Planning (Northern Ireland) Order 1991 will have future impacts on air quality within Down District Council**.**
The Council has five neighbouring council areas: Ards Borough Council; Castlereagh Borough Council; Lisburn Borough Council; Banbridge District Council and Newry and Mourne District Council.

1.4 THE UPDATING SCREENING AND ASSESSMENT (USA) PROCESS

The updating screening and assessment for 7 of the pollutants specified in the Air Quality Regulations 2000 and Air Quality (Northern Ireland) Amendment Regulations 2003 is outlined in Chapter 2. This assessment is based on the LAQM.TG (03) Updated Screening Assessment Checklist (January 2006) and identifies those matters that have changed since the first round was completed in 2000, and which may now require further assessment. It considers new monitoring data, new objectives, and new sources of pollution or significant changes to existing sources.
If there is a risk that changes may be significant, a simple screening assessment has been carried out. The screening assessment determines whether an air quality objective will be exceeded at a location with relevant public exposure. The regulations make clear that

likely exceedances of the objectives should be assessed in relation to "the quality of the air at locations, which are situated outside of buildings or other natural or man made structures, above or below ground, and where members of the public are regularly present."

If there is sufficient risk of an exceedance of an objective, Down District Council is required to undertake a detailed assessment to identify with reasonable certainty whether or not a likely exceedance will occur. The Detailed Assessment Report, if required, will be completed by the end of April 2007.

For each pollutant assessed, the following information is provided: A summary of conclusions from the 1st round of review and assessment, the air quality objective specified in the Air Quality Regulations, and a summary of findings. The aim of chapter 2 is to identify any locations and pollutants for which it is considered necessary to carry out a Detailed Assessment.

1.5 Sources of Information

A number of organisations have provided information used in this report:

Monitoring Data: Monitoring data held by Down District Council has been considered, together with data from other organisations, in an attempt to provide a comprehensive picture. Data collected from outside the boundary of Down District Council is used where monitoring data for a particular pollutant is not available. Continuous monitoring data sources include the National Air Quality Information Archive on the Internet (http://www.aeat.com/netcen/airqual/welcome.html).

Background Pollutant Concentrations: Where information is not already available within the Council, background pollutant concentrations have been used from mapped data available from the National Air Quality Information Archive.

Traffic: The Roads Service, Northern Ireland have supplied traffic growth forecasts from 1999 to 2005.

Industrial Pollution Control: Significant emissions of pollutants are likely from a number of different processes. The DEFRA Technical Guidance LAQM. TG (03) document identifies part A, and B processes most likely to release significant quantities of specified pollutants into the atmosphere.

2.0 UPDATING SCREENING AND ASSESSMENT FOR CO

2.1 SOURCES

The main source of emissions of carbon monoxide in the UK is from road transport, which accounted for 67% of total releases in 2000. In 1997 petrol vehicles accounted for 71% of the UK total, and 95% of the road transport emission of carbon monoxide. Diesel vehicle emissions of carbon monoxide are relatively small, and in 1997 contributed only 3% of the national total (DETR, 2000).

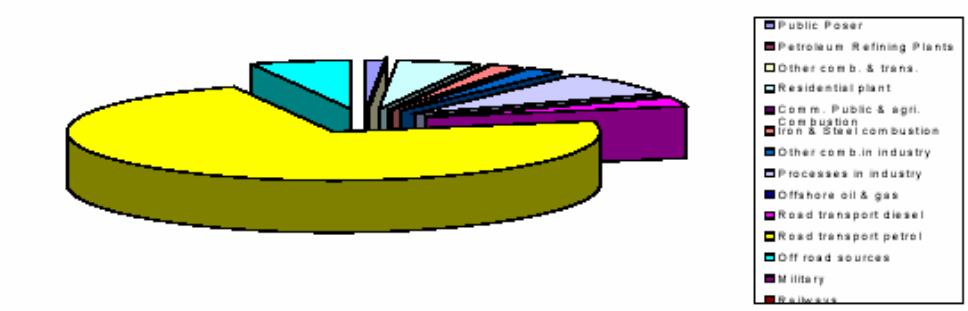


Figure 1.0 UK % Carbon Monoxide Emissions 1997. Source: *DETR, 2000*

2.1.1 Summary of conclusions from first round review and assessement carbon monoxide

TABLE 3 – conclusions of 1st round for CO

POLLUTANT	STAGE 1: POTENTIAL EXCEEDANCE	FINAL REPORT: EXCEEDANCE IDENTIFIED
CARBON MONOXIDE	NO	NO

TABLE 4- CO air quality objective

POLLUTANT	AIR QUALITY OBJECTIVE	DATE TO BE ACHIEVED BY
CARBON MONOXIDE	10mg/m^3 UK Maximum daily running 8-hour mean	31/12/2003

TABLE 5 Summary of Findings from 2006 USA for CO

DATA ASSESSED	DETAILED ASSESSMENT REQUIRED	PARAGRPAH NUMBER
MONITORING DATA	NO	2.1.3
VERY BUSY ROADS	NO	2.1.4

2.1.2 EFFECTS ON HEALTH

CO reduces the capacity of blood to carry oxygen, deliver it to tissues and blocks important reactions in the cells. Life threatening concentrations of carbon monoxide may be inhaled without giving any warning to the victim. The first sign of severe poisoning is loss of consciousness and further inhalation of high concentrations readily leads to death. These effects are due to the interference of carbon monoxide with the processes whereby oxygen is taken up by the blood and utilised in the cells of the body. It does this both by interfering with transport of oxygen by red cells in the blood (by the formation of carboxyhaemoglobin, which substantially reduces the ability of red cells to carry oxygen) and also by blocking essential biochemical reactions in cells.

2.1.3 Monitoring Data

Are any maximum daily running 8-hour concentrations greater than 10mg/m^3?

Down District Council does not monitor carbon monoxide concentrations. However, carbon monoxide concentrations are measured at national automatic sites within the National Automatic Urban Network. Of the UK national network sites, Belfast is the nearest roadside site on the national monitoring network and maximum 8-hour mean concentrations at this location are shown in table 6.

TABLE 6- carbon monoxide results for Belfast monitoring station 2004

YEAR	**MAX 8-HOUR MEAN CO conc (mg/m^3)**
2004	**2.8**

Only monitoring data at roadside sites needs to be considered for review and assessment of carbon monoxide (DEFRA, 2003). The site in Belfast achieved the Air Quality Strategy (AQS) Objective for this pollutant by the required date of 31st December 2003, and continues to meet the objective. It is assumed that the 2003 objective will also be met within Down District Council.

2.1.4 Very busy roads or junctions in built up areas.

Are any predicted annual mean concentrations in 2003 greater than 1 mg/m^3?

The carbon monoxide objective is most likely to be exceeded close to very busy roads or junctions. Roads and junctions in Down District Council with the highest traffic flows were identified: none of these roads can be classified as "very busy" as defined in LAQM.TG (03). The highest AADT within Down District Council is the A7 with 11,600 in 2005.

2.1.5 Conclusion of 2005 USA for Carbon Monoxide

The 2005 USA for carbon monoxide in Down District Council indicates that the 2003 air quality objective for carbon monoxide is unlikely to be exceeded; therefore no detailed assessment is required.

2.2 UPDATING SCREENING AND ASSESSMENT BENZENE

TABLE 7- Conclusions of 1st round for benzene

POLLUTANT	STAGE 1: POTENTIAL EXCEEDANCE	FINAL REPORT: EXCEEDANCE IDENTIFIED
BENZENE	NO	NO

TABLE 8 – Benzene air quality objective

POLLUTANT	AIR QUALITY OBJECTIVE	DATE TO BE ACHIEVED BY
BENZENE	16.25µg/m^3 running mean 5.00 µg/m^3 annual mean	31/12/2003 31/12/2010

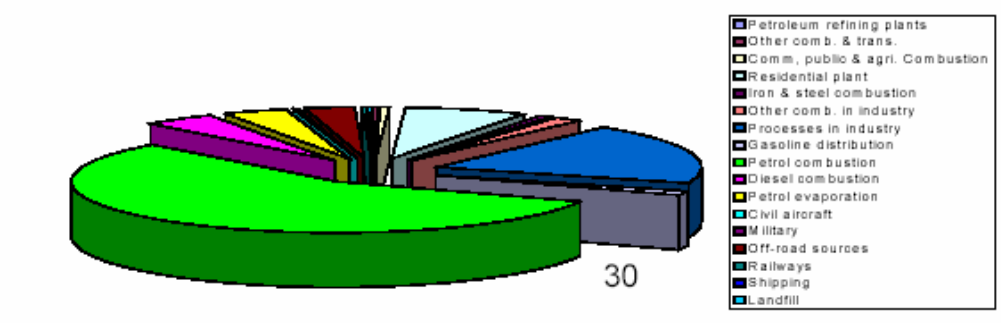
Table 9 Summary of findings of 2006 Updating and screening assessment for benzene.

DATA ASSESSED	**DETAILED ASSESSMENT REQUIRED**	**PARAGRPAH NUMBER**
MONITORING DATA	**NO**	**2.2.3**
VERY BUSY ROADS	**NO**	**2.2.4**
INDUSTRIAL SOURCES	**NO**	**2.2.5**
OTHER SOURCES	**NO**	**2.2.6**

2.2.1 SOURCES

In the UK, motor vehicles are the most important single source of benzene, although the amount of benzene in petrol is regulated to an upper limit and currently comprises on average about 2% by volume (DETR 2000).

Figure 2 UK % Benzene Emissions 1997 Source: *DETR, 2000*



2.2.2 Health Effects

Benzene is a recognised genotoxic human carcinogen and workers exposed to high levels of benzene in the past have demonstrated an increased risk of leukemia.

At concentrations occurring in the ambient atmosphere, benzene does not have short-term or acute effects. The risk of leukemia in industrial workers, exposed to much higher concentrations of benzene, has been related to their calculated lifetime exposure - the more benzene a person has been exposed to, the greater the risk. Levels of benzene currently found in outdoor air do not exceed levels at which a health effect would be expected.

2.2.3 Monitoring data

Are there any running annual means greater than 16.25µg/m^3, are there any annual means greater than 5µg/m^3 and are there any running annual means greater than 3.25µg/m^3?

Down District Council does not monitor benzene concentrations. However, benzene concentrations measured in Belfast show that the 2003 air quality objective has been met and continue to be met (EHS, 2005). There is no need to proceed to a detailed assessment.

2.2.4 Very busy roads or junctions in built up areas

Are any predicted annual means in 2010 greater than 5µg/m^3 or are any predicted running annual means in 2010 greater than 3.25µg/m^3?

The benzene objective is most likely to be exceeded close to very busy roads or junctions, in areas with high background concentrations of benzene. Roads and junctions in Down District Council with the highest traffic flows were identified: none of these roads can be classified as "very busy" as defined in LAQM.TG (03). The highest AADT within Down District Council is the A7 with 11,600 in 2005. There is no need to proceed to a detailed assessment.

2.2.5 Industrial sources

There are no industrial processes in Down District Council or neighbouring authorities, which release significant quantities of benzene into the air.

2.2.6 Other sources

Petrol stations, which have an annual throughput of more than 2000m^3 of petrol per year, may emit sufficient benzene to exceed the 2010 objective, especially if they are located near a busy road (more than 30,000 vehicles per day). There are no petrol stations within Down District Council, which handle that amount of petrol. Therefore a detailed assessment for benzene from petrol stations in Down District Council is not required. There are no major fuel storage depots handling petrol in Down District Council.

2.2.7 CONCLUSION OF 2006 USA FOR BENZENE

Emissions of benzene have declined nationally by 45% between 1990 and 1999 and are forecast to decline further as a result of the introduction of lower maximum benzene content levels in petrol since January 2000 (DEFRA, 2003). DEFRA predicts that existing policy measures should be sufficient to achieve the strategy's present objective of 16.25 $\mu g/m^3$ at all background and roadside locations by the end of 2003. In addition, the objective of 5 $\mu g/m^3$ should be met at all urban background locations and possibly all roadside locations by 2010.

The 2006 USA for benzene in Down District Council indicates that the 2003 and 2010 air quality objectives for benzene will be met; therefore, a detailed assessment will not be required.

2.3 UPDATING SCREENING AND ASSESSMENT 1,3 BUTADIENE

TABLE 10 – Conclusions of 1st round 1,3 Butadiene

POLLUTANT	STAGE 1: POTENTIAL EXCEEDANCE	FINAL REPORT: EXCEEDANCE IDENTIFIED
1,3 Butadiene	NO	NO

TABLE 11 – 1,3 Butadiene air quality objective

POLLUTANT	AIR QUALITY OBJECTIVE	DATE TO BE ACHIEVED BY
1,3 Butadiene	2.25µg/m^3 running annual mean	31/12/2003

Table 12 Summary of findings of 2006 USA for 1,3 Butadiene.

DATA ASSESSED	**DETAILED ASSESSMENT REQUIRED**	**PARAGRPAH NUMBER**
MONITORING DATA	**NO**	**2.3.3**
INDUSTRIAL SOURCES	**NO**	**2.3.4**

2.3.1 SOURCES

The main source of emissions on 1,3 butadiene in the UK is from road transport. The only other source of 1,3 butadiene in the UK comes from the chemical industry through the manufacture and use of this chemical. Forecasts of emissions of 1,3 butadiene from road transport in urban areas of the UK project a decrease by 77% between 1995 and 2005 (DETR, 2000). This decline is due to the significant reduction in emissions from petrol vehicles.

2.3.2 HEALTH EFFECTS

1,3-butadiene exposure can possibly lead to the induction of cancers of the lymphoid system and blood forming tissues, lymphomas and leukemia. It is thus a carcinogen and, in theory, it is not possible to determine an absolutely safe level for human exposure.

2.3.3 MONITORING DATA

Are any current running annual means greater than 2.25 µg/m^3 ?

Down District Council does not monitor 1,3 butadiene concentrations. However, maximum running annual mean concentrations of 1,3 butadiene measured at all urban background and roadside locations nationally are already well below the 2003 objective of 2.25 µg/m^3. In addition studies at a national level, based on both measured and modelling data, suggest that there is little likelihood of the objective for 1,3 butadiene being exceeded by 2003 (DEFRA, 2003).

2.3.4 Industrial Sources

There are no industrial processes in Down District Council or neighbouring authorities with emissions of 1,3 butadiene, which are likely to give rise to exceedances of the running annual mean objective for 1,3 butadiene. Therefore a detailed assessment for 1,3 butadiene from industrial sources in Down District Council is not required.

2.3.5 CONCLUSION OF 2006 USA FOR 1,3 BUTADIENE.

The 2003 objective of 2.25µg/m^3 is already being met at all urban background and roadside locations nationally (DEFRA, 2003). The 2003 USA for 1,3 butadiene in Down District Council indicates that the 2003 air quality objective for 1,3 butadiene will be met, therefore a detailed assessment is not required.

2.4 UPDATING SCREENING AND ASSESSMENT LEAD

TABLE 13 Summary of conclusions from 1st round for lead

POLLUTANT	STAGE 1: POTENTIAL EXCEEDANCE	FINAL REPORT: EXCEEDANCE IDENTIFIED
LEAD	NO	NO

TABLE 14- Lead air quality objective

POLLUTANT	AIR QUALITY OBJECTIVE	DATE TO BE ACHIEVED BY
LEAD	0.5 µg/m^3 annual mean 0.25 µg/m^3 annual mean	31/12/2004 31/12/2004

Table 15 Summary of findings of 2006 USA for LEAD.

DATA ASSESSED	**DETAILED ASSESSMENT REQUIRED**	**PARAGRPAH NUMBER**
MONITORING DATA	**NO**	**2.4.3**
INDUSTRIAL SOURCES	**NO**	**2.4.4**

2.4.1 Sources

The main source of emissions of lead in the UK in 1997 was from road transport, which accounted for 61% of total releases. Industrial combustion was another significant source, with the non-ferrous metals sector accounting for 16% of annual emissions in 1997 (DETR, 2000).

Emissions of lead fell significantly between 1990 and 1997 due to the reduction of the lead content of leaded petrol from around 0.34g/l to 0.143g/l in 1986. The sale of leaded petrol was banned from 1st January 2000, which reduced emissions from transport to almost zero. Emissions of lead are now restricted to specific industrial activities.

2.4.2 Health effects

Direct human exposure to lead occurs through food, water, dust, soil and air. Most people receive the largest portion of their daily lead intake via food, although other sources may be important to specific members of the population. For example, from water areas with lead pipes and a plumb solvent water supply, in areas where populations live near to point sources, from paint flakes where young children live in houses with leaded paint or from contaminated soil.

2.4.3 MONITORING DATA.

Are any current annual means greater than 0.5 µg/m^3 and are there any current annual means greater than 0.25 µg/m^3 ?

Lead concentrations are not monitored by Down District Council; however, lead in air concentrations at all background and kerbside UK national network monitoring sites are well below the objectives for 2004 and 2008 (DEFRA, 2003). A detailed assessment does not need to be carried out.

2.4.4 INDUSTRIAL SOURCES

There are no industrial processes in Down District Council with emissions of lead, which are likely to give rise to exceedances of the running annual mean objective. In addition, there have been no new industrial processes authorized/permitted in Down District Council with the potential to emit lead since 2000. Therefore a detailed assessment for lead from industrial sources in Down is not required.

2.4.5 CONCLUSION OF 2006 USA for LEAD

The 2004 and 2008 objectives of 0.5 µg/m^3 and 0.25 µg/m^3 are already being met at all background and kerbside sites nationally (DEFRA, 2003). The 2006 USA for lead in Down District Council indicates that the 2004 and 2008 air quality objectives for lead will be met within Down District Council; therefore a detailed assessment is not required.

2.5 UPDATING SCREENING AND ASSESSMENT NITROGEN DIOXIDE

TABLE 16- Conclusions of 1st round review of NO2

POLLUTANT	STAGE 1: POTENTIAL EXCEEDANCE	FINAL REPORT: EXCEEDANCE IDENTIFIED
NO_2	YES	NO

TABLE 17- NO_2 air quality objective

POLLUTANT	AIR QUALITY OBJECTIVE	DATE TO BE ACHIEVED BY
Nitrogen Dioxide	200 µg/m^3 1- hour mean not to be exceeded more than 18 times a year. 40 µg/m^3 annual mean	31/12/2005 31/12/2005

Table 18 Summary of findings of 2006 USA for Nitrogen Dioxide

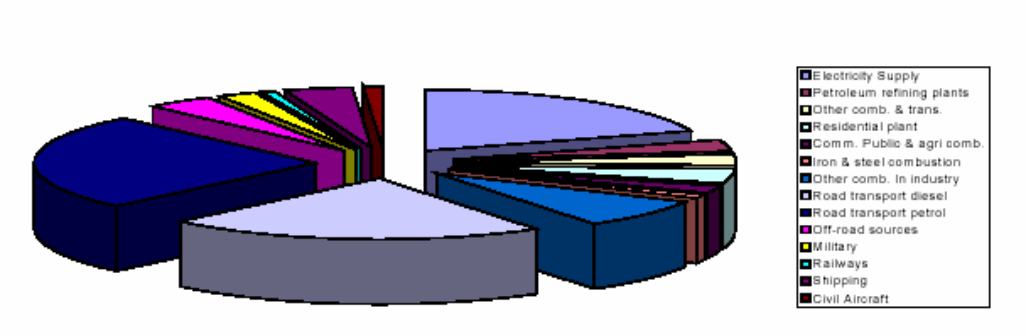
DATA ASSESSED	**DETAILED ASSESSMENT REQUIRED**	**PARAGRPAH NUMBER**
Monitoring data	**NO**	**2.5.3**
Narrow congested streets with residential properties close to the kerb	**NO**	**2.5.4**
Junctions	**NO**	**2.5.5**
Busy street where people may spend 1-hour or more close to traffic	**NO**	**2.5.6**
Roads with high flow of buses and/or HGV's	**NO**	**2.5.7**

New roads constructed or proposed since 1st round of review and assessment	**NO**	**2.5.8**
Roads close to the objective during the first round of review and assessment	**NO**	**2.5.9**
Roads with significantly changed traffic flows	**NO**	**2.5.10**
Bus Stations	**NO**	**2.5.11**
New industrial sources	**NO**	**2.5.12**
Existing industrial sources	**NO**	**2.5.13**
Aircraft	**NO**	**2.5.14**

2.5.1 Sources

Nitric oxide (NO) and nitrogen dioxide (NO_2) are often referred to as nitrogen oxides (NOx). Around half of total emissions of nitrogen oxides in the UK in 1997 were from road transport, which accounted for 48% of total releases. Other significant sources of nitrogen oxides in 1997 included the electricity supply industry (20%) and other industrial and commercial sectors (17%) (DETR, 2000). See figure 5.0

Figure 3, % UK annual NOX emissions 1997. Source: *DETR, 2000*



UK annual emissions of nitrogen oxides from road transport has declined in recent years, and urban traffic nitrogen oxides emissions are estimated to fall by 20% between 2000 and 2005 and by 46% between 2000 and 2010 (Steadman et al, 2001). However, road transport was still the principal source of nitrogen oxides emissions in 2000, accounting for 49% of total UK emissions (*DEFRA, 2003*).

2.5.2 Health Effects

Nitrogen dioxide is an irritant gas, which has been known for many years to have serious and sometimes fatal effects on health when inhaled in the very high concentrations associated with accidental exposures. Young children and people with asthma have been identified as sensitive groups who may be affected during high NO_2 pollution incidents. Individuals with chronic bronchitis, emphysema or other chronic respiratory diseases may also be sensitive to NO_2 exposure.

2.5.3 Monitoring data

Are any predicted annual means in 2005 greater than 40 µg/m^3? and are there currently more than 18 exceedances of 200 µg/m^3, or are any 99.8th percentiles greater than 200 µg/m^3?

The NO_2 monitoring results provide a general indication of average NO_2 concentrations in Down District Council. All of the sites monitored between 2000 and 2004 in Down District Council are below the presumptive level of 40µg/m^3 (figure 6). Ruddock and Sherratt Public Analysts carried out the analysis of the diffusion tubes within Down until November 2004. This Laboratory was not included in the Air Quality Consultant's database of co-location studies, which didn't allow calculation of a valid bias correction factor. Since November 2004 Casella began the analysis of Down District's diffusion tubes. This permitted a bias correction factor to be applied to the data for 2005 in this USA report. (appendix 2)

.

Figure 4- Measured NO_2 levels for years 2002-2004 (no correction factor)

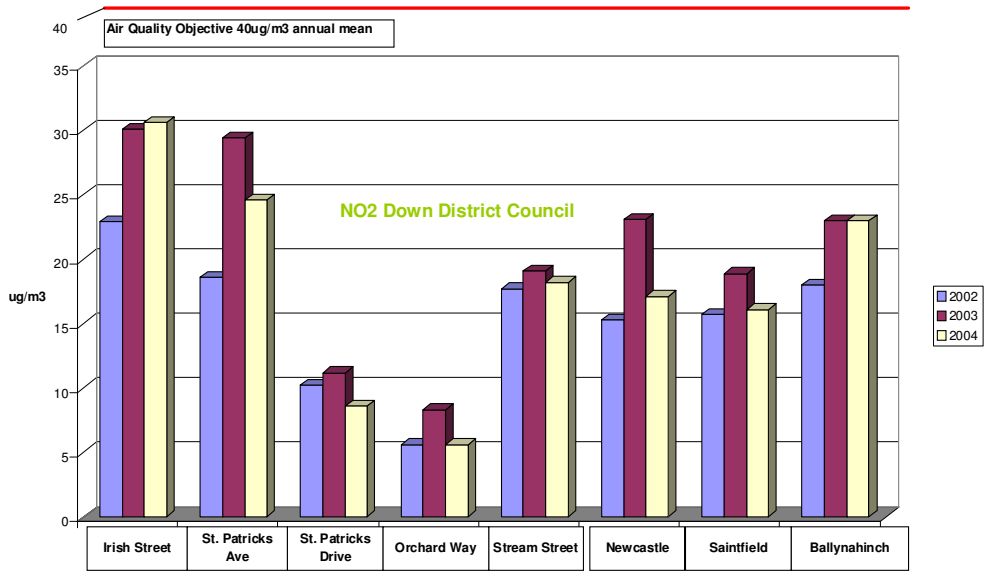
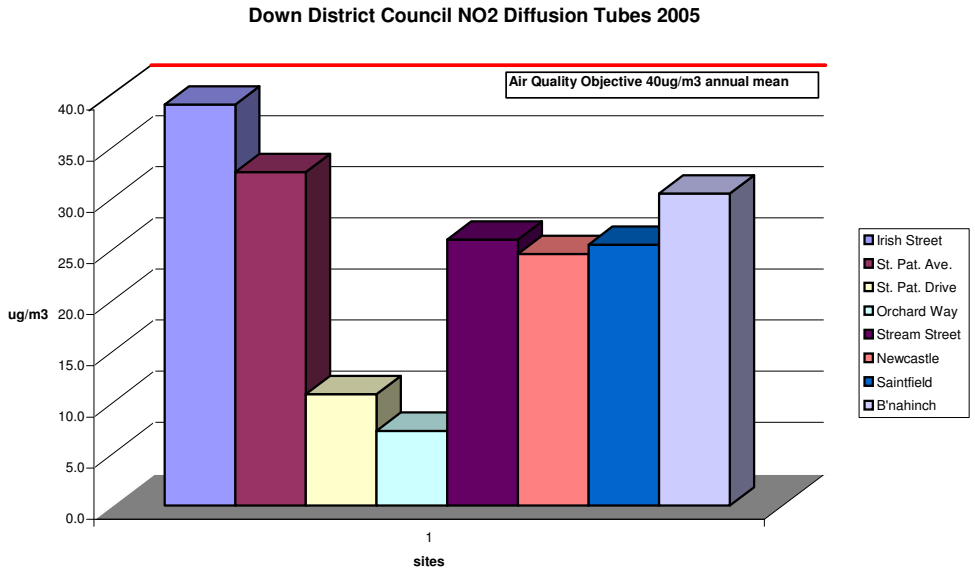


Figure 5 shows the NO_2 results for 2005 with a bias adjustment factor of 0.81 applied. This factor is derived from averaging co-location studies in Castlereagh Council (0.82), Lisburn City Council (1.03), North Down Council (0.66) and Liverpool Speke (0.75)(appendix 2).



The highest level is 39.2 µg/m^3 at Irish Street, Downpatrick. LAQM.TG(03) states that as the annual mean is not greater than 40 µg/m^3 there is no need to proceed to a detailed assessment. However, as the value is close to the air quality objective Down District will relocate diffusion tubes to the façade of the nearest residential property at the Irish Street junction and monitor the levels for an additional year. The figure below (figure 8) shows that projected values for NO_2 in 2010 will meet the air quality objective at all monitoring sites.

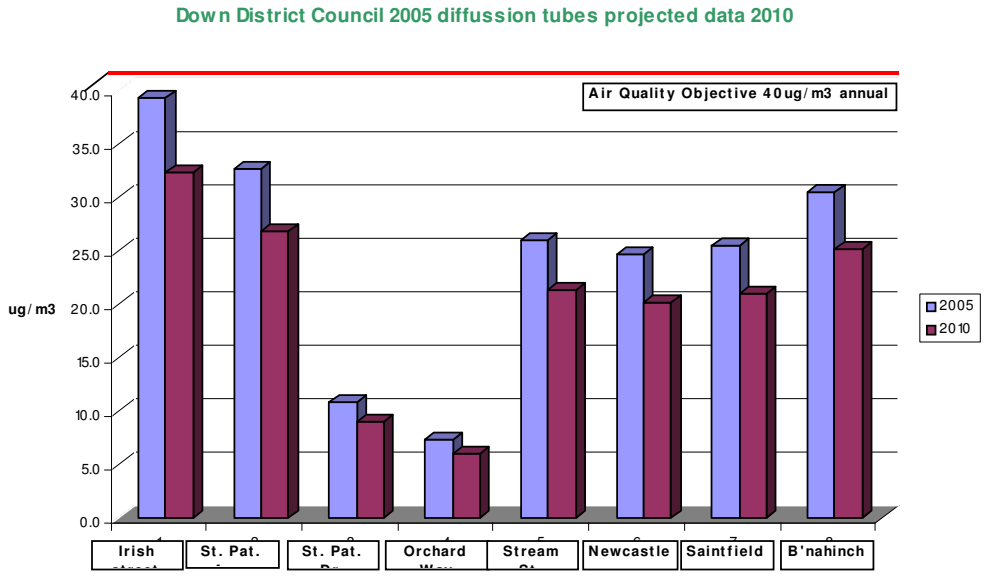


Figure 6- Annual average diffusion tube concentrations and projections for the Down District Council Area in 2010.

Down District Council does not have any continuous monitoring data for NO_2 with which to calculate the number of 1-hour exceedances of 200 µg m^{-3} in a full year, or the 99.8th percentile of hourly means. However, if the annual mean objectives are not exceeded, it can be assumed that the short-term (1-hour) objectives will also be met (DEFRA, 2003).

2.5.4 NARROW CONGESTED STREETS WITH RESIDENTIAL PROPERTIES CLOSE TO THE KERB

Are any of the predicted annual means in 2005 greater than 40 µg m^{-3}

Concentrations of NO_2 are often higher where traffic is slow moving with stop/start driving, and where buildings either side reduce dispersion, i.e. narrow congested streets with residential properties close to the kerb. Roads and traffic flows in Down District Council were assessed to identify narrow streets with residential properties within 5 m of the kerb where the average speed is 50kph or less, the traffic flow is greater than 10,000 vehicles per day and where the carriageway is less than 10m wide.

No such street was identified meeting these criteria.

2.5.5 Junctions

Are any predicted annual means in 2005 greater than 40 µg m^{-3}?

One junction in Down District Council was identified with a traffic flow of more than 10,000 vehicles per day with relevant exposure within 10 metres of the kerb. Predictions for mean NO_2 concentrations for 2005 at this junction were made using the DMRB screening model (ver1.02). This is a simple methodology for estimating the concentrations of air pollutants in the vicinity of roads. Using data supplied by the Roads Service in Downpatrick i.e. 9,360 vehicles per day and 7,860 vehicles per day for the junction of Irish Street and Market Street (highest diffusion tube figure), Downpatrick, an annual mean of 21.11µg m^{-3} was predicted and 15.49 µg m^{-3} for 2010. Concentrations were assessed with traffic speeds relevant to the roads and the distance from the receptor to the center of the road as required by DMRB. The distance was assumed to be 3 metres. Background concentrations of nitrogen dioxide were ascertained from the internet address- http://www.aeat.co.uk/netcen/airqual/ ,i.e. 7µg m^{-3}. The annual average background estimates were combined with the annual roadside predictions from the DRMB to derive the final estimated concentration. The result obtained is lower than the diffusion tube adjusted figure of 2005 for the Irish Street location, i.e. that figure was 39.2µg m^{-3}(appendix 3). The result can be seen in the table below. The predicted annual means were below the annual mean limit value of 40µg m^{-3}. As monitoring data is available from a diffusion tube station at Irish Street (39.2 µg m^{-3}), this data should be used in preference to the DMRB (ver1.02) screening model to reach a decision (DEFRA, 2003). A detailed assessment is not required but as stated in 2.5.3 an improved assessment will occur at this junction.

TABLE 19- DMRB

Junction	NO2- 2005 µg m^{-3}
IRISH STREET- 2005	**21.11**
IRISH STREET- 2010	**15.49**

2.5.6 BUSY STREETS WHERE PEOPLE MAY SPEND 1-HOUR OR MORE CLOSE TO TRAFFIC.

No streets in Down District Council were identified with more than 10,000 vehicles per day where members of the public may be exposed within 5 m of the kerb for 1 –hour.

2.5.7 Roads with high flow of buses and or HGV'S

Roads where traffic flows are not high (less than 20,000 vehicles per day) but which have an unusually high proportion of buses and/or HGV's (25%) can be a major source of nitrogen oxides.

There are no such roads in Down District Council area and a detailed assessment for NO_2 is not necessary.

2.5.8 New roads constructed or proposed since 2000

There have been no new roads constructed within Down District Council since 2000. Therefore, a detailed assessment for nitrogen dioxide is not necessary.

2.5.9 Roads close to the objective in 2000

No roads were close to the objective in 2000. Further assessments for nitrogen dioxide is not necessary.

2.5.10 Roads with significantly changed traffic flows

The A7 road from Downpatrick to Belfast is the only road in Down District Council area with more than 10,000 vehicles per day (AADT). However, there are no roads within Down District Council which has experienced large increases in traffic (greater than 25% AADT) since the first round of review and assessment.

There is no relevant public exposure near the A7. It is considered, therefore, that further assessment for nitrogen dioxide at this location is not necessary.

2.5.11 Bus Stations

The Bus station in Down District Council is located in Market Street, Downpatrick. There is no relevant exposure within 10m. Therefore a detailed assessment for nitrogen dioxide at this location is not necessary.

2.5.12 New Industrial Processes

Since the first round of review and assessment, there has been no new part A or B industrial processes authorized/permitted in Down District Council or the surrounding area with the potential to emit significant quantities of nitrogen oxides.

2.5.13 Existing Industrial Processes

No Processes were identified in the first round of review and assessment as having the potential to emit quantities of nitrogen oxides.

2.5.14 Aircraft

There are no airports in Down District Council. Therefore a detailed assessment of emissions of nitrogen dioxide from aircraft is not necessary.

2.5.15 Conclusion of 2006 USA for Nitrogen Dioxide

The 2006 USA for nitrogen dioxide indicates that the 2005 annual mean objective of 40 $\mu g/m^3$ has been achieved in all areas of Down District Council and no detailed assessment is necessary. Increased surveillance is recommended at the Irish Street junction and this will be completed in the Progress Report due in April 2007. This will involve additional diffusion tubes located close to the façade of the residential accommodation (2 apartments) and also consideration of a real time continuous monitor.

2.6 UPDATING AND ASSESSMENT OF SULPHUR DIOXIDE (SO_2)

TABLE 20 – Conclusions of 1st round for SO_2

POLLUTANT	STAGE 1: POTENTIAL EXCEEDANCE	FINAL REPORT: EXCEEDANCE IDENTIFIED
Sulphur dioxide	YES	NO

TABLE 21 – SO_2 air quality objective

POLLUTANT	AIR QUALITY OBJECTIVE	DATE TO BE ACHIEVED BY
Sulphur Dioxide	350 µg/m^3 not to be exceeded more than 24 times a year	31/12/2004
	125 µg/m^3 not to be exceeded more than 3 times a year	31/12/2004
	266 µg/m^3 not to be exceeded more than 35 times a year	31/12/2004

Table 22 Summary of findings of 2006 Updating and screening assessment for Sulphur Dioxide

DATA ASSESSED	DETAILED ASSESSMENT REQUIRED	PARAGRPAH NUMBER
Monitoring data	**NO**	**2.6.3**
New industrial sources	**NO**	**2.6.4**
Existing industrial sources	**NO**	**2.6.5**
Areas of domestic coal burning	**NO**	**2.6.6**
Small boilers (>5MW (thermal) burning coal or oil	**NO**	**2.6.7**
Shipping	**N/A**	**2.6.8**
Railway Locomotives	**N/A**	**2.6.9**

2.6.1 SOURCES

The principal source of SO_2 is from the combustion of fossil fuels in domestic premises and , more importantly, non-nuclear power stations. Fossil fuel burning power stations account for around two thirds of total SO_2 emissions in the UK. Other industrial processes contribute a further 20%, with vehicles, primarily diesel, accounting for a mere 2%.

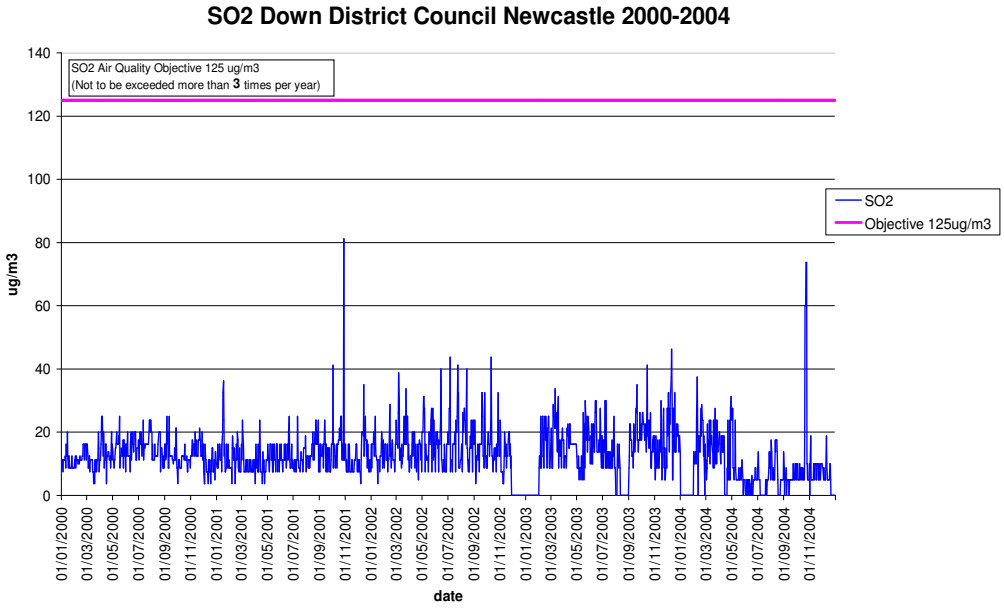
2.6.2 HEALTH EFFECTS

SO_2 is an irritant when it is inhaled and at high concentrations may cause severe problems in asthmatics such as narrowing of the airways, known as bronchoconstriction. Asthmatics are considerably more sensitive to the effects of SO_2 than other individuals and an effect on lung function may be experienced at levels as low as 200ppb.

2.6.3 Monitoring data

Sulphur dioxide monitoring continued in Newcastle, Co.Down (370315) until November 2005 when the equipment was relocated to Ballynahinch (Langley Road Estate, 364532). Ballynahinch was chosen in consultation with the Northern Ireland Housing Executive, as it contained a high percentage of coal burning households. Up until its relocation data from the 8-port machine showed that the air quality objectives were being met. Down District Council may consider discontinuing monitoring of Sulphur Dioxide once a calendar year of data has been obtained from the Ballynahinch monitoring station and it indicates that the objectives continue to be met. Figure 7 shows the SO_2 levels from 2000-2004, data for 2005 is incomplete due to equipment maintenance issues.

FIGURE 7



2.6.4 New Industrial Processes

Since the first round of review and assessment, there has been no new part A or B industrial processes authorized/permitted in Down District Council or the surrounding area with the potential to emit significant quantities of sulphur dioxide.

2.6.5 Existing Industrial Processes

No Processes were identified in the first round of review and assessment as having the potential to emit quantities of sulphur dioxide.

2.6.6 Domestic Coal Burning

Exceedance of the sulphur dioxide objectives may occur in areas where solid fuels are the predominant form of domestic heating; e.g. in an area of 500 x 500m where there may be more than 100 houses burning solid fuel as their primary source of heating (DEFRA, 2003). Monitoring has been occurring within the Down District Council area with daily mean readings below trigger levels. The 8-port sampler was relocated to another housing estate with a high proportion of coal burning in November 2005 (but not more than 100 houses in a 500 x 500m area). At the end of November 2006 a calendar year of results will be available. There are no areas within Down District Council that have more than 100 houses per 500 x 500m area burning solid fuel as their primary source of heating. Therefore a detailed assessment for sulphur dioxide from domestic coal burning in Down District Council is not required.

2.6.7 Small boilers > 5MW (thermal)

No such boilers are known within the Down District Council area. Therefore a detailed assessment of sulphur dioxide from small boilers >5MW (thermal) in Down District Council is not required.

2.6.8 Shipping

Not applicable.

2.6.9 Railway Locomotives

Not applicable

2.6.10 Conclusion of 2006 USA for Sulphur Dioxide

In recent years sulphur dioxide concentrations have been falling at UK national network sites (DEFRA, 2003). Local exceedances of objectives may occur in areas where industrial processes are located, which have the potential to emit large quantities of sulphur dioxide or where there is a high concentration of solid fuel households. The 2006 USA for sulphur dioxide within Down District Council indicates that all the objectives for sulphur dioxide will be achieved and no detailed assessment is required.

2.7 UPDATING AND SCREENING ASSESSMENT FOR PARTICLES (PM_{10})

TABLE 23- PM_{10} conclusions from 1st round review

POLLUTANT	STAGE 1: POTENTIAL EXCEEDANCE	FINAL REPORT: EXCEEDANCE IDENTIFIED
PARTICLES (PM_{10})	YES	NO

TABLE 24 – PM_{10} air quality objective

POLLUTANT	AIR QUALITY OBJECTIVE	DATE TO BE ACHIEVED BY
PARTICLES (PM_{10})	50 µg/m^3 -24 hour mean not to be exceeded more than 35 times a year	31/12/2004
	40 µg/m^3 annual mean	31/12/2004
	50 µg/m^3 -24 hour mean not to be exceeded more than 7 times a year	31/12/2010
	20 µg/m^3 annual mean	31/12/2010

Table 25 Summary of findings of 2006 Updating and screening assessment for PM_{10}

DATA ASSESSED	DETAILED ASSESSMENT REQUIRED	PARAGRPAH NUMBER
Monitoring data	**NO**	**2.7.3**
Junctions	**NO**	**2.7.4**
Roads with high flow of buses and/or HGV's	**NO**	**2.7.5**
New roads constructed or proposed since last round of review and assessment.	**NO**	**2.7.6**
Roads close to the objective during the first round of Review and Assessment	**NO**	**2.7.7**
Roads with significantly changed traffic flows	**NO**	**2.7.8**
New industrial sources	**NO**	**2.7.9**
Industrial sources with substantially increased emissions	**NO**	**2.7.10**
Areas of domestic solid fuel burning	**NO**	**2.7.11**
Quarries/landfill sites/opencast coal/handling of dusty cargoes at ports etc	**NO**	**2.7.12**
Aircraft	**NO**	**2.7.13**

2.7.1 SOURCES

Particles are either primary or secondary. Primary particles are directly emitted from sources such as fossil fuel power stations, motor vehicles and factories flues. Vehicle exhaust emissions are estimated to contribute around 25% of atmospheric particulate matter as a national average, although this figure could rise to over 80% in cities. Secondary particles are less easy to source but they mainly comprise particulates formed as sulphates and nitrates from other pollutants such as sulphur dioxide or nitrogen dioxide.
There are also natural particulates in the form of airborne spores and pollen grains

2.7.2 EFFECTS ON HEALTH

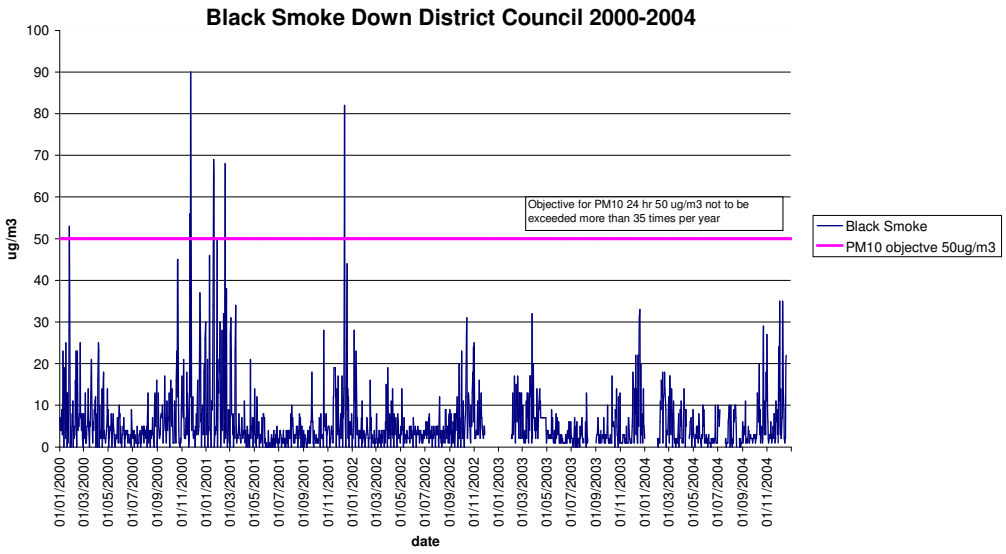
With gaseous pollutants, experiments involving controlled exposure have been carried out to indicate concentrations above which harm may occur, but these experiments have not been technically possible for mixtures of particulate pollutants characteristic of ambient PM_{10}. As a result of this, most evidence has come from epidemiological studies of populations. Results remain inconclusive as to a threshold level but there is some evidence to link an increase in daily mortality with increased levels of particulate concentrations. Of the causes of mortality shown to be related to levels of particles, lung cancer is prominent along with cardio-respiratory diseases.

2.7.3 Monitoring data

PM_{10} concentrations are not monitored in Down District Council. However, Down District Council does use a 8 port bubbler located up to the end of October 2005 in Newcastle and subsequently relocated to Ballynahinch. LAQM.TG(03) advises against relying on the black smoke data obtained from such equipment. However, it can be useful for indicating “hotspots.” Figure 10 shows that the air quality objectives were not exceeded between 2000 and 2004. Based on this information a

detailed assessment is not required. A complete data set is not available for 2005 due to equipment maintenance.

FIGURE 8 – Showing Black Smoke in Down Council area 2000-2004- **Guidance Only**



2.7.4 Junctions

Are there more than 35, 24-hour exceedances of the 50 µg/m^3 predicted in 2004?

One junction was identified with a traffic flow of more than 10,000 vehicles per day with relevant exposure within 10m of the kerb. Predictions for the number of 24-hour exceedances of 50 µg/m^3 in 2004 at this junction were made using the DMRB screening model (appendix 3) the result was; 4.28, 24 hour exceedances of the 50 µg/m^3. The predicted number of 24-hour exceedances of 50µg/m3 in 2004 at relevant locations was below 35; therefore, a detailed assessment for PM_{10} from junctions in Down District Council is not required.

2.7.5 Roads with High Flow of Buses and/or HGV's

Are there more than 35 24-hour exceedances of the 50 µg/m^3 predicted in 2004?

Roads which have an unusually high proportion of buses and/or HGV's (20%) can be a major source of PM_{10}. No roads in Down District Council exceed this percentage; therefore, a detailed assessment for PM_{10} at these locations is not necessary.

2.7.6 New Roads Constructed or Proposed Since 2000

Are there any exceedances of the objectives at relevant locations?

There have been no new roads constructed within Down District Council since 2000. Therefore a detailed assessment for PM_{10} is not necessary.

2.7.7 Roads Close To the Objective in 2000

Are there any roads with more than 30 but fewer than 36, 24-hour exceedances of 50 µg/m^3 in 2004, which have not been reassessed using the new emissions factors?

No roads were close to the objective in 2000. Further assessments for PM_{10} are not necessary.

2.7.8 Roads with Significantly Changed Traffic Flows

Are there more than 35 24-hour exceedances of the 50 µg/m^3 predicted in 2004?

There are no roads within Down District Council which have experienced large increases in traffic (greater than 25% AADT) since the first round of review and assessment. It is considered, therefore, that further assessment for PM_{10} at this location is not necessary.

2.7.9 New Industrial Processes

Since the first round of review and assessment, there have been no new part A or B industrial processes authorized/permitted in Down District Council or the surrounding area with the potential to emit significant quantities of particles.

2.7.10 Existing Industrial Processes

There are no industrial sources with substantially increased emissions.

2.7.11 Areas of domestic solid fuel burning

Exceedance of the PM_{10} objectives may occur in areas where solid fuels are the predominant form of domestic heating e.g. in an area of 500 x 500m where there may be more than 50 houses burning solid fuel as their primary source of heating (DEFRA 2003).

The results of using the SO_2 and black smoke equipment indicates that a detailed assessment of PM_{10} from domestic smoke is not required.

2.7.12 Quarries

Quarries and landfill sites may be significant sources of PM_{10}. This is because at any location where dust is emitted, a proportion, (typically around 20%) will be present as PM_{10}. However, the significance and resultant impacts of dust emissions from these sources are dependant upon the amount of dust created, the proximity of dust sensitive locations to the sources of dust, and the prevailing meteorological conditions for that location.

Active mineral workings and waste sites in Down District Council were assessed to establish whether there was any relevant exposure nearby ('relevant exposure' and 'near' are defined in Technical Guidance LAQM. TG (03) (DEFRA 2003*).* No relevant exposure was found nearby.

Detailed assessments are not required from these sources for the following reasons:

• Dust mitigation measures are in use, which are effective in controlling dust emissions to maintain amenity at properties where relevant exposure occurs.

• Low potential for significant emission of dust from site.

• The last complaint relating to dust from a quarry was in 2003 and from observation there are no current dust concerns with any of the quarries.

2.7.13 Aircraft

Aircraft are not major sources of PM_{10} emissions, but may make a contribution close to the source (DEFRA, 2003). There are no airports in Down District Council and therefore a detailed assessment of emissions of PM_{10} is not necessary.

2.7.14 Conclusion of 2006 USA for PM_{10}

The 2006 USA for PM_{10} within Down District Council indicates that the annual mean and 24 hour objectives will be met by 2004, therefore no detailed assessment is required.

3.0 CONCLUSION

This USA was carried out according to 'Local Air Quality Management Technical Guidance' LAQM. TG (03). It has indicated that all the air quality objectives listed in Appendix 1 will be met by the relevant deadlines. Air Quality Management Areas (AQMAs) are only required in areas where air quality objectives will not be achieved. No AQMA's are required in Down District Council and there is no need for a detailed assessment in 2007.

4.0 RECOMMENDATIONS

Down District Council will carry out further air quality assessments in the forthcoming years to ensure that adverse changes in air quality are identified promptly. To assist with air quality management in Down District Council, consideration will be given to the following:

- Identification of potentially sensitive locations in Down District Council for additional nitrogen dioxide diffusion tube monitoring.
- Assessment of the need for an automatic monitoring station for Irish Street Junction, Downpatrick.
- Assessment of all new and proposed residential and business developments in Down District Council for impact on air quality.
- Assessment of all new and proposed roads in Down District Council for impact on air quality.

5.0 REFERENCES

Abbot J, and Stedman J (1999) *Dispersion modelling and mapping studies for review and assessment of $PM_{10,}$* AEA Technology, AEAT-5273

DEFRA, 2000, *Air Quality Regulations 2000*. DEFRA

DEFRA, 2003, *Part IV of the Environment Act 1995, Local Air Quality Management*. Technical Guidance LAQM TG (03). DEFRA.

DEFRA, http://www.defra.gov.uk/environment/airquality/aqs, accessed 25th April 2006

DETR, 2000, *The Air Quality Strategy for England, Scotland, Wales & Northern Ireland*. HMSO.

National Atmospheric Emissions Inventory: http://www.aeat.com/netcen/airqual/emissions/den-naei.html

Pollution Inventory: http://www.environment-agency.gov.uk

UK Air Quality Information Archive: http://www.airquality.co.uk/archive/index.php, accessed 25th April 2006

www.nisra.gov.uk, accessed 25th April 2006

6.0 BIBLIOGRAPHY

AEA Technology (1997) Instruction Manual: UK Smoke and SO_2 Networks

DEFRA (2003) Technical Guidance LAQM.TG (03) DEFRA

DETR (1999) Design Manual for Roads and Bridges, Vol 11, Section 3, Part 1, 'Air Quality'. The Stationary Office.

DETR (2000) The Air Quality Strategy for England, Scotland, Wales and Northern

Ireland. Department of the Environment, Transport and the Regions. Cm 4548, SE

2000/3, NIA 7

Environment Agency (E1) (1997) Guidance for Operators and Inspectors of IPC Processes. Best Practicable Environmental Option Assessments for Integrated Pollution Control. Technical Guidance Note (Environmental).

Environment Agency (1998) Guidance for Estimating the Air Quality Impact of Stationary Sources, National Centre for Risk Analysis & Options Appraisal GN24 (GSS).

Appendix1

Table 1: Air Quality Strategy Objectives and EC Directive Limit Values, applicable in Northern Ireland

Averaging period	EC Limit Value or AQS Objective	No. of Permitted exceedences	To be achieved by (AQS Objectives)	To be achieved by (EC Directive Limit Values)
Carbon Monoxide (CO)				
Max. Daily 8-hourMean	10 mgm^{-3}	-	-	1 Jan 2005
Running 8-hour mean	10 mgm^{-3}	-	31 Dec 2003	-
Nitrogen Dioxide (NO_2) and total oxides of nitrogen (NO_x)				
1 hour	200 $\mu g\ m^{-3}$	18 per year	31 Dec 2005	1 Jan 2010
Annual Mean	40 $\mu g\ m^{-3}$	-	31 Dec 2005	1 Jan 2010
Annual Mean, for protection of vegetation (rural areas)	30 $\mu g\ m^{-3}$ Total NOx	-	31 Dec 2000	19 July 2001
Sulphur Dioxide (SO_2)				
15 minute	266 $\mu g\ m^{-3}$	35 per year	31 Dec 2005	-
1 hour	350 $\mu g\ m^{-3}$	24 per year	31 Dec 2004	1 Jan 2005
24 hour	125 $\mu g\ m^{-3}$	3 per year	31 Dec 2004	1 Jan 2005
Annual mean and winter (1st October – 31st March), for protection of vegetation (rural)	20 $\mu g\ m^{-3}$	-	31 Dec 2000	19 July 2001
Particulate Matter (PM_{10}), as measured using a gravimetric method				
24 hour	50 $\mu g\ m^{-3}$	35 per year	31 Dec 2004	1 Jan 2005
24 hour [a]	50 $\mu g\ m^{-3}$	7 per year	31 Dec 2010	1 Jan 2010
Annual Mean	40 $\mu g\ m^{-3}$	-	31 Dec 2004	1 Jan 2005

Deleted: *

Annual Mean [a]	20 $\mu g\ m^{-3}$	-		1 Jan 2010	Deleted: *
Ozone (O_3)					
Max. daily 8-hour mean. Compliance assessment to be based on the average number of days exceedence over 3 consecutive years.	120 $\mu g\ m^{-3}$	25 days per calendar year	-	Averaged over 3 years, beginning 2010.	
AOT40[b], calculated from 1h values May- July. *For protection of vegetation.*	18,000 $\mu g\ m^{-3}$ h	-	-	Averaged over 5 years, beginning 2010	
Max. daily running 8-hour mean [a]	100 $\mu g\ m^{-3}$	10 days per year	31 Dec 2005	-	Deleted: [cb]
Benzene					
Running annual mean **Calendar Year Mean**	16.25 $\mu g\ m^{-3}$ 3.25 $\mu g\ m^{-3}$	-	31 Dec 2003 31 Dec 2010	- 1 Jan 2010	
1,3 Butadiene					
Running annual mean	2.25 $\mu g\ m^{-3}$	-	31 Dec 2003	-	
Air Quality Strategy for PAH (Not at present adopted in Northern Ireland)					
PAHs [c] ***(using B(a)P as an indicator)*** **Calendar year mean**	0.25 ng m^{-3}	-	31 Dec 2010		Deleted: [d*]
Lead					
Calendar Year Mean (1)	0.5 $\mu g\ m^{-3}$ (= 500 ng m^{-3})	-	31 Dec 2004	1 Jan 2005, or 1 Jan 2010 in the immediate vicinity of industrial sources.	
Calendar Year Mean (2)	0.25	-	31 Dec	-	

	$\mu g\ m^{-3}$ (= 250 $ng\ m^{-3}$)		2008	

a) *Not prescribed in regulations for the purposes of local air quality management*

b) *AOT 40 is the sum of the differences between hourly concentrations greater than 80 µg m^{-3} (=40ppb) and 80 µg m^{-3}, over a given period using only the 1-hour averages measured between 0800 and 2000.*

c) No policy decision has yet been taken on the inclusion of the PAH objective for Northern Ireland.

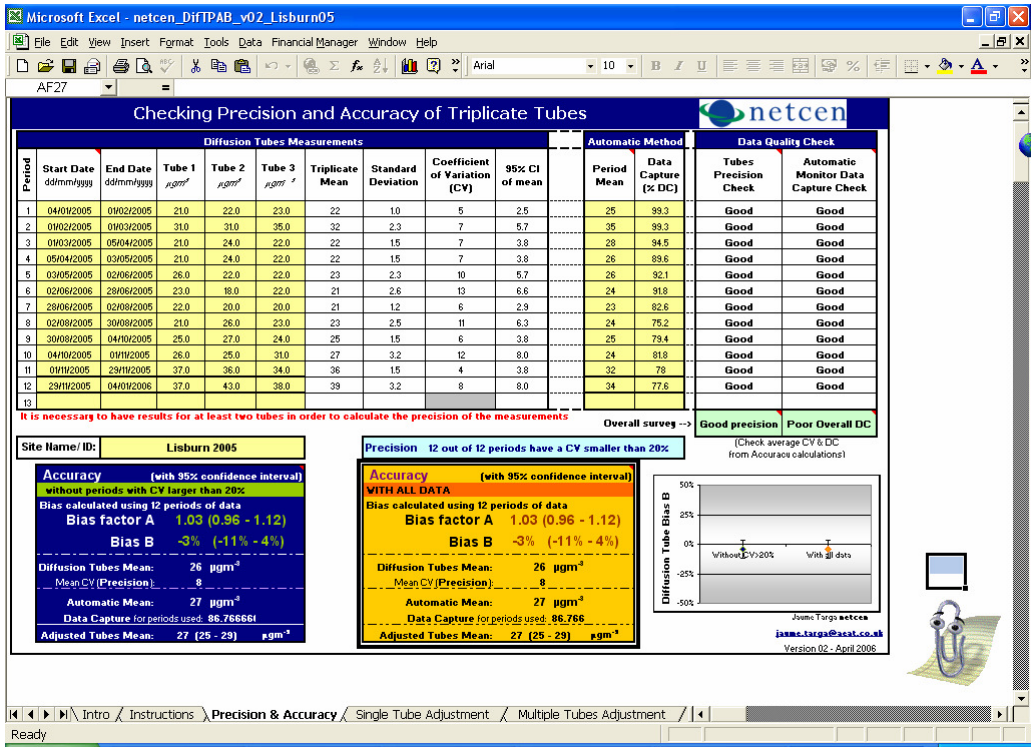
Deleted: <#>¶

APPENDIX 2- NO2 MONITORING DATA AND BIAS ADJUSTMENTS

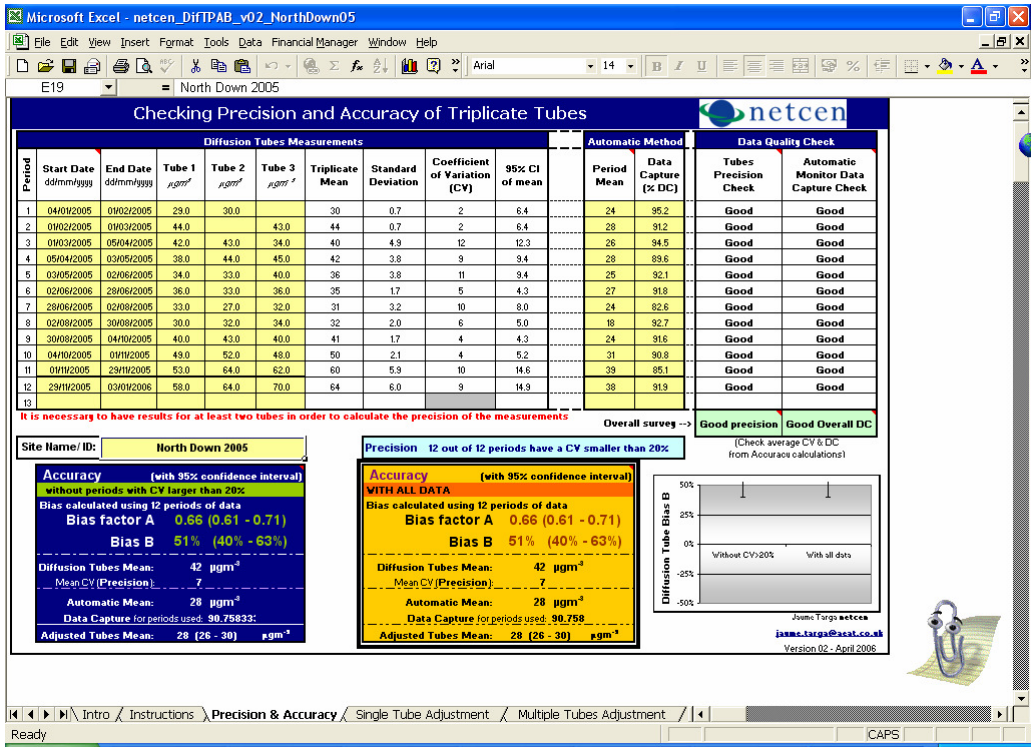
TABLE 26- data with bias factor adjustment

	2002	2003	2004	2005	0.81 bias applied	2010
Irish Street	22.9	30.1	30.6	48.5	39.2	32.3
St. Patricks Avenue	18.6	29.4	24.6	40.3	32.6	26.8
St. Patricks Drive	10.2	11.2	8.6	13.5	10.9	9.0
Orchard Way	5.6	8.3	5.6	9.1	7.3	6.0
Stream Street	17.7	19.1	18.2	32.2	26.0	21.4
Newcastle	15.3	23.1	17.1	30.4	24.6	20.2
Saintfield	15.7	18.9	16.1	31.5	25.5	21.0
Ballynahinch	18	23	23	37.7	30.5	25.1

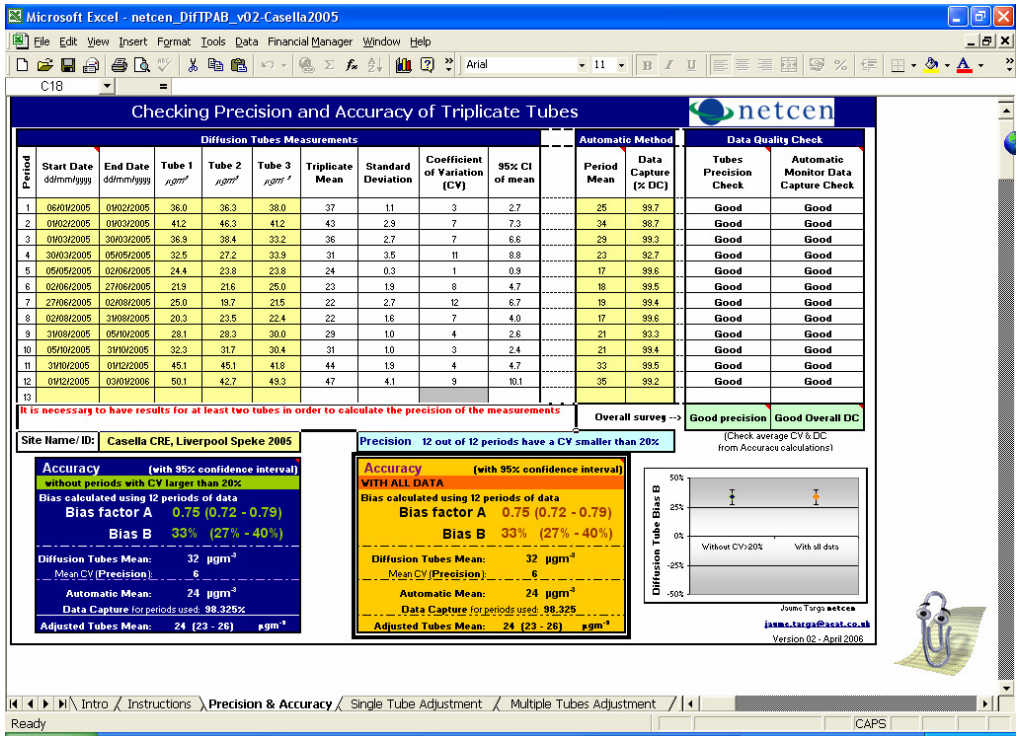
LISBURN CITY COUNCIL



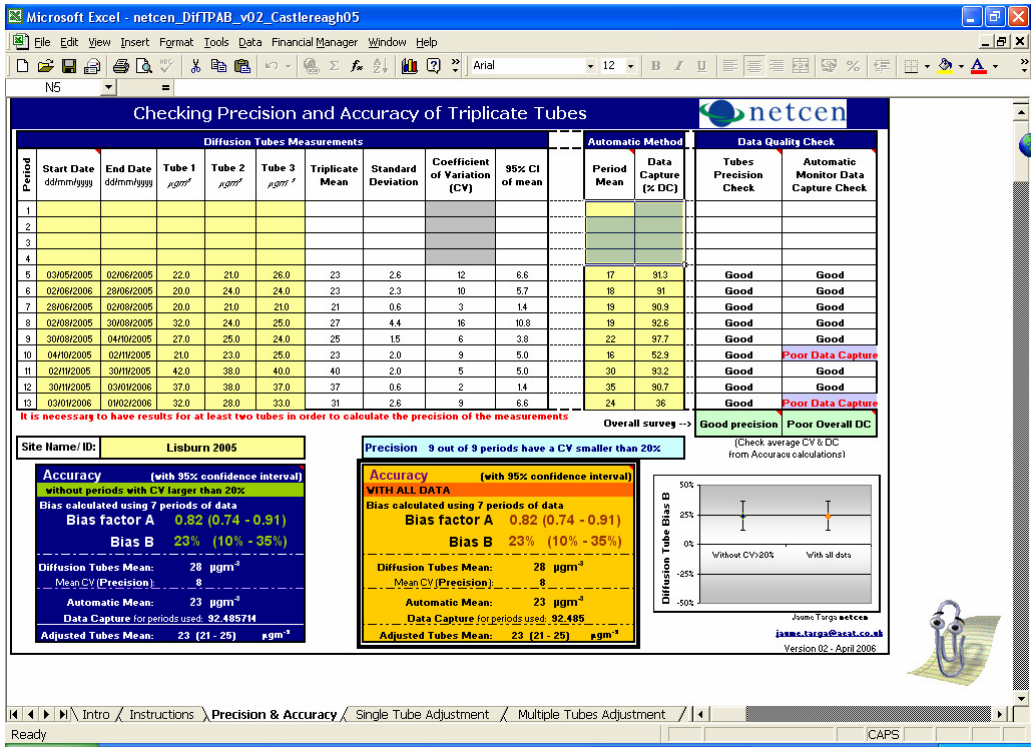
North Down

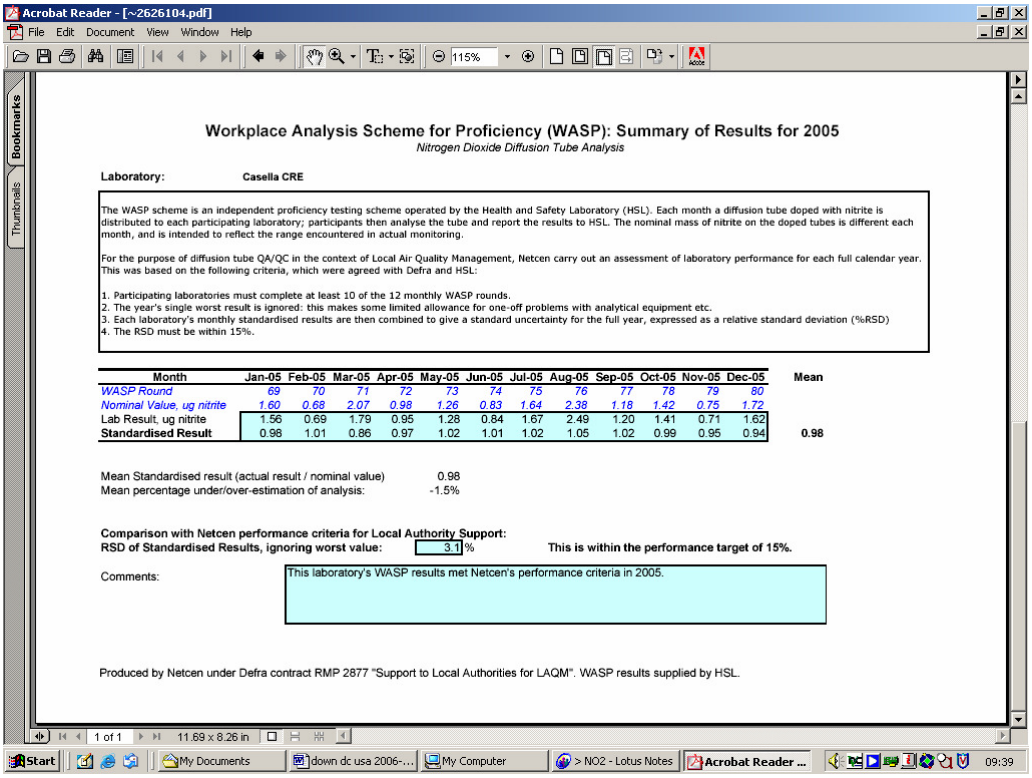

Microsoft Excel - netcen_DifTPAB_v02_NorthDown05
File Edit View Insert Format Tools Data Financial Manager Window Help
E19
North Down 2005
Checking Precision and Accuracy of Triplicate Tubes
netcen
Diffusion Tubes Measurements
Automatic Method
Data Quality Check
Period
Start Date dd/mm/yyyy
End Date dd/mm/yyyy
Tube 1 µgm-3
Tube 2 µgm-3
Tube 3 µgm-3
Triplicate Mean
Standard Deviation
Coefficient of Variation (CV)
95% CI of mean
Period Mean
Data Capture (% DC)
Tubes Precision Check
Automatic Monitor Data Capture Check
1 04/01/2005 01/02/2005 29.0 30.0 30 0.7 2 6.4 24 95.2 Good Good
2 01/02/2005 01/03/2005 44.0 43.0 44 0.7 2 6.4 28 91.2 Good Good
3 01/03/2005 05/04/2005 42.0 43.0 34.0 40 4.9 12 12.3 26 94.5 Good Good
4 05/04/2005 03/05/2005 38.0 44.0 45.0 42 3.8 9 9.4 28 89.6 Good Good
5 03/05/2005 02/06/2005 34.0 33.0 40.0 36 3.8 11 9.4 25 92.1 Good Good
6 02/06/2006 28/06/2005 36.0 33.0 36.0 35 1.7 5 4.3 27 91.8 Good Good
7 28/06/2005 02/08/2005 33.0 27.0 32.0 31 3.2 10 8.0 24 82.6 Good Good
8 02/08/2005 30/08/2005 30.0 32.0 34.0 32 2.0 6 5.0 18 92.7 Good Good
9 30/08/2005 04/10/2005 40.0 43.0 40.0 41 1.7 4 4.3 24 91.6 Good Good
10 04/10/2005 01/11/2005 49.0 52.0 48.0 50 2.1 4 5.2 31 90.8 Good Good
11 01/11/2005 29/11/2005 53.0 64.0 62.0 60 5.9 10 14.6 39 85.1 Good Good
12 29/11/2005 03/01/2006 58.0 64.0 70.0 64 6.0 9 14.9 38 91.9 Good Good
13
It is necessary to have results for at least two tubes in order to calculate the precision of the measurements
Overall survey --> Good precision Good Overall DC
(Check average CV & DC from Accuracy calculations)
Site Name/ ID: North Down 2005
Precision 12 out of 12 periods have a CV smaller than 20%
Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A 0.66 (0.61 - 0.71)
Bias B 51% (40% - 63%)
Diffusion Tubes Mean: 42 µgm-3
Mean CV (Precision): 7
Automatic Mean: 28 µgm-3
Data Capture for periods used: 90.75833:
Adjusted Tubes Mean: 28 (26 - 30) µgm-3
Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.66 (0.61 - 0.71)
Bias B 51% (40% - 63%)
Diffusion Tubes Mean: 42 µgm-3
Mean CV (Precision): 7
Automatic Mean: 28 µgm-3
Data Capture for periods used: 90.758
Adjusted Tubes Mean: 28 (26 - 30) µgm-3
Diffusion Tube Bias B
50%
25%
0%
-25%
-50%
Without CV>20%
With all data
Jaume Targa netcen
jaume.targa@aeat.co.uk
Version 02 - April 2006
Intro Instructions Precision & Accuracy Single Tube Adjustment Multiple Tubes Adjustment
Ready
CAPS

Liverpool Speke (CASELLA)



CASTLEREAGH
COUNCIL





WASP FOR CASELLA

APPENDIX 3- DMRB SCREENING TOOL