**BMT Cordah Limited**
ENVIRONMENTAL CONSULTANCY
AND INFORMATION SYSTEMS

# Local Air Quality Management Progress Report

## A Report for North Lanarkshire Council

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**Report No:** BMT Cordah Ltd/{NLC.005/2005}
**Status:** Final
**Version:** One
**Date of Release:** 17 May 2005
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L3/EDI/26B/T/QAM/26.09.03/B

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# 1 INTRODUCTION

The Environment Act 1995 and subsequent regulations require local authorities to conduct a Review and Assessment of air quality in their area to assess compliance with the standards and objectives set out in the *Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000,* the *Air Quality Regulations 2000* and *Air Quality (Scotland) Amendment Regulations 2002*. The National Air Quality Strategy (NAQS) objectives for the purposes of Review and Assessment are shown in Table 1.

The framework of Local Air Quality Management (LAQM) requires a Review and Assessment of air quality by local authorities on a regular basis. Guidance for this process is provided by LAQM Technical guidance LAQM.TG(03) (Reference 1).

North Lanarkshire Council concluded their second round of Review and Assessment in 2004, following the publication of an Updating & Screening Assessment (U&SA) in 2003, and a Detailed Assessment in 2004 (References 2 and 3).

The U&SA reviewed all seven pollutants in the NAQS, and identified those which may exceed their NAQS objectives. It concluded that there is potential for exceedences of the NAQS objectives for Nitrogen Dioxide ($NO_2$), Sulphur Dioxide ($SO_2$) and Particulate Matter ($PM_{10}$).

A Detailed Assessment was therefore required to focus on these three pollutants and highlight where potential problems existed. The Detailed Assessment concluded that there was potential for exceedence of the 2010 $PM_{10}$ annual mean objective at four road junctions in the Council area as a result of road traffic emissions coupled with the high background $PM_{10}$ concentration. The junctions were:

- junction of A723 Hamilton Rd. and A721 West Hamilton St./Muir St., Motherwell (Motherwell Cross);
- junction of A721 Windmillhill St. and B754 Airbles Rd., Motherwell (Civic Centre);
- junction of A725 Whifflett St. and B753 Calder St./School St., Coatbridge (Whifflett); and
- junction of A73 and B799 Main Street, Chapelhall (Chapelhall).

Furthermore, exceedences of the 2010 annual mean objective for $PM_{10}$ were predicted by a dispersion modelling study of emissions from domestic solid fuel burning in the village of Salsburgh. Potential for a similar exceedence of the $PM_{10}$ objective was also identified in Greengairs.

In response to the Detailed Assessment further monitoring work has been undertaken at each of the road junctions identified and within the village of Salsburgh. A domestic fuel survey was also undertaken within Greengairs in 2004 and dispersion modelling undertaken to predicted ambient $PM_{10}$ concentrations within the village.

To ensure continuity in the Review and Assessment process, local authorities are required to undertake an annual Progress Report in years when Update & Screening and Detailed Assessments are not being undertaken. Progress Reports report on new monitoring data and new developments since the last U&SA and Detailed Assessment.

This report forms North Lanarkshire Council's Progress Report, and includes an update of new monitoring data within the area, and in particular monitoring data at the locations of potential exceedence of the 2010 NAQS objective for $PM_{10}$. The report also includes the assessment of $PM_{10}$ concentrations in Greengairs as a result of domestic fuel burning emissions and considers new developments in the area to assess their impact to local air quality.

This report has been undertaken with reference to the Technical guidance LAQM.TG(03) and Progress Report Guidance LAQM.PRG(03) (Reference 4).

*Table 1 Objectives included in the Air Quality regulations 2000 and (Amendment) Regulations 2002 for the purposes of Local Air Quality Management*

| Pollutant | Objective | | Date to be Achieved By |
|---|---|---|---|
| | Concentration | Measured As | |
| Benzene | 16.25μg/m$^3$ (5ppb) | Running annual mean | 31 December 2003 |
| | 3.25 μg/m$^3$ (1ppb) | Annual mean | 31 December 2010 |
| 1,3-Butadiene | 2.25μg/m$^3$ (1ppb) | Running annual mean | 31 December 2003 |
| Carbon monoxide (CO) | 10mg/m$^3$ (10ppm) | Running 8 hour mean | 31 December 2003 |
| Lead | 0.5μg/m$^3$ | Annual mean | 31 December 2004 |
| | 0.25μg/m$^3$ | Annual mean | 31 December 2008 |
| Nitrogen dioxide ($NO_2$) | 200μg/m$^3$ (105ppb) not to be exceeded more than 18 times per year[1] | 1 hour mean | 31 December 2005 |
| | 40μg/m$^3$ (21ppb) | Annual mean | 31 December 2005 |
| Particles ($PM_{10}$) | 50μg/m$^3$ not to be exceeded more than 35 times per year[2] | 24 hour mean | 31 December 2004 |
| | 40μg/m$^3$ | Annual mean | 31 December 2004 |
| | 50μg/m$^3$ not to be exceeded more than 7 times per year[3] | 24 hour mean | 31 December 2010 |
| | 18μg/m$^3$ | Annual mean | 31 December 2010 |
| Sulphur dioxide ($SO_2$) | 50μg/m$^3$ (132ppb) not to be exceeded more than 24 times a year[4] | 1 hour mean | 31 December 2004 |
| | 125μg/m$^3$ (47ppb) not to be exceeded more than 3 times a year[5] | 24 hour mean | 31 December 2004 |
| | 266μg/m$^3$ (100ppb) not to be exceeded more than 35 times a year[6] | 15 minute mean | 31 December 2005 |

[1] corresponds to the 99.79$^{th}$ percentile concentration of hourly mean concentrations

[2] corresponds to the 90.4$^{th}$ percentile concentration of 24-hour mean concentrations

[3] corresponds to the 98th percentile concentration of 24-hour mean concentrations

[4] corresponds to the 99.7$^{th}$ percentile concentration of 1-hour mean concentrations

[5] corresponds to the 99$^{th}$ percentile concentration of 24-hour mean concentrations

[6] corresponds to the 99.9$^{th}$ percentile concentration of 15-minute mean concentrations

# 2 NITROGEN DIOXIDE

The Detailed Assessment of $NO_2$ concluded that it was unnecessary to declare any Air Quality Management Areas (AQMAs) within North Lanarkshire, however a number of locations were identified at which monitoring data indicated potential exceedences of the NAQS annual mean objective for $NO_2$. No exceedences of the hourly mean objective were predicted.

The locations of potential exceedences were:

- Junction of A73 and B799 Main St., Chapelhall, dispersion modelling and monitoring identified high $NO_2$ concentrations and potential exceedence of the annual mean objective.

- Junction of A721 Windmillhill St. and B754 Airbles Road, dispersion modelling and monitoring identified high $NO_2$ concentrations and potential exceedence of the annual mean objective.

- Bank Street, Coatbridge. Consistent high $NO_2$ concentrations measured over several years.

- New Edinburgh Road, Uddingston. Diffusion tube monitoring recorded exceedences of the annual mean objective.

Monitoring data at each of these locations and at other sites throughout the North Lanarkshire area are presented in Sections 2.1 to 2.4.

## 2.1 Diffusion Tube Monitoring

Monitoring of $NO_2$ with passive diffusion tubes has continued across the North Lanarkshire Council region since the Detailed Assessment. Additional tubes were added to the network to improve monitoring in areas where potential exceedences, were identified in the Detailed Assessment. The additional sites are located at Chapelhall, Bank St., Coatbridge and Merry St., Motherwell. Furthermore, additional sites were added close to bus stations at Tinkers Lane, Motherwell and Castlehill Rd., Overtown. Additional sites were also added to allow a co-location study of the diffusion tubes with a chemiluminescent analyser. Lastly, a diffusion tube was located on the Ravenscraig site to allow the long-term trend of pollutant concentrations to be tracked as the site is developed.

A number of diffusion tube sites were discountinued in January 2004. These were tubes located alongside the A8/M8, however the sites had continuously measured annual average concentrations substantially below the NAQS objective.

The locations of the diffusion tube monitoring sites are illustrated in Figure 1.

*QA/QC of Diffusion Tube Data*

The laboratory analysis of the passive diffusion tubes is carried out by Glasgow Scientific Services (GSS), who have UKAS accreditation to do so. The tubes are prepared using 20% TEA in water.

Diffusion tube monitoring is less accurate than continuous monitoring techniques, therefore technical guidance LAQM.TG(03) recommends that diffusion tubes should be co-located with chemiluminesence analysers to compare the results in order to validate the performance of the diffusion tubes and analysis technique. This performance is described as laboratory bias and all diffusion tubes analysed at the same laboratory must have their results corrected to allow for the bias.

A co-location study was carried out in North Lanarkshire in 2004. Three diffusion tubes were co-located with the automatic monitoring site at Harthill. The average annual mean of the three tubes is compared to the annual mean measured by the automatic analyser, and a bias adjustment factor is calculated following the methodology contained in technical guidance LAQM.TG(03).

Diffusion tubes analysed by GSS are also co-located with an automatic analyser at the Glasgow Centre automatic urban network (AUN) monitoring site. The bias correction factor calculated for Glasgow Centre is also included for comparison. The calculated bias corrections factors are presented in Table 2.

*Table 2 Diffusion tube bias adjustment*

| Site Name | Average diffusion tube annual mean (µg/m$^3$) (Dm) | Chemiluminescent annual mean (µg/m$^3$) (Cm) | Bias adjustment factor (Cm/Dm) |
|---|---|---|---|
| Harthill | 28.1 | 23.2 | 0.86 |
| Glasgow Centre | 43.4 | 32.0 | 0.74 |

These values for bias adjustment are comparable to factors used in previous assessments, which were calculated from co-location studies carried out by Glasgow City Council. The factor calculated from the Harthill site has been applied to all diffusion tube monitoring results. It is considered that this value is a reasonable assessment of diffusion tube bias across North Lanarkshire.

*Diffusion Tube Monitoring Data*

Results of monitoring of $NO_2$ using diffusion tubes are presented in Table 3.

*Table 3 $NO_2$ Diffusion Tube Monitoring Results*

| | | Annual Mean $NO_2$ Concentration (µg/m$^3$) | | | | |
|---|---|---|---|---|---|---|
| Location | Site Type | 2000 | 2001 | 2002 | 2003 | 2004 |
| Coatbridge 1, Bank St. | Kerbside | 62 | 38 | 38 | 39 | 37 |
| Coatbridge 2, Whifflet Court | Roadside | 36 | 30 | 26 | 30 | 29 |
| Airdrie 1, Hallcraig St. | Background | 39 | 27 | 22 | 24 | 26 |
| Airdrie 3, Springwells Cresc. | Background | 26 | 19 | 19 | 21 | 20 |
| Auchenkilns, Cumbernauld | Kerbside | 84 | 70 | 68 | 81 | 56 |
| Southfield Road, Cumbernauld | Kerbside | 32 | 27 | 24 | 28 | 30 |
| Lauchope Street, Chapelhall | Kerbside | 57 | 42 | 41 | 46 | 39 |
| Civic Centre, Motherwell | Kerbside | 50 | 35 | 36 | 40 | 38 |
| Health Centre, Motherwell | Roadside | 30 | 21 | 21 | 21 | 21 |
| Emily Drive, Motherwell | Background | 21 | 11 | 12 | 15 | 15 |
| Kethers lane, Motherwell | Background | 20 | 19 | 17 | 19 | 17 |
| Coursington Road, Motherwell | Roadside | 18 | 16 | 14 | 14 | 18 |
| Craigneuk Road, Carfin | Kerbside | 20 | 20 | 15 | 18 | 18 |
| Coatbridge 3, Hozier Street | Kerbside | - | 31 | 26 | 25 | 26 |
| Camp Street, Motherwell | Background | - | 25 | 19 | 21 | 19 |
| Showcase Cinema Carpark (formerly Braehead Farm, R4) | other (motorway) | - | 43 | 37 | 38 | 40 |
| Shawhead, R9 | other (motorway) | - | 39 | 34 | 37 | 37 |
| Orchard Farm A8 East, R11 | other (motorway) | - | 37 | 29 | 32 | 32 |

*Table 3 cont'd*

| Location | Site Type | Annual Mean $NO_2$ Concentration (µg/m$^3$) | | | | |
|---|---|---|---|---|---|---|
| | | 2000 | 2001 | 2002 | 2003 | 2004 |
| Woodhall Kennels, Calderbank, R12 | other (motorway) | - | 25 | 18 | 20 | - |
| Sandyford Farm, Newhouse R13 | other (motorway) | - | 19 | 16 | 19 | - |
| Salsburgh R14 | other (motorway) | - | 22 | 19 | 24 | 21 |
| Salsburgh R15 | other (motorway) | - | 25 | 19 | 22 | 24 |
| Salsburgh R16 | other (motorway) | - | 26 | 21 | 23 | - |
| Dewshill Cottages, R17 | other (motorway) | - | 21 | 19 | 20 | - |
| Blair House, R18 | other (motorway) | - | 30 | 25 | 26 | - |
| R19 | other (motorway) | - | 20 | 16 | 17 | - |
| Blairmuchole Road, R20 | other (motorway) | - | 21 | 23 | 25 | - |
| 129 Edinburgh Road, R21 | other (motorway) | - | 23 | 21 | 24 | - |
| 46 Howburn Road, R22 | other (motorway) | - | 22 | 13 | 19 | 21 |
| Orchard Fam A8 West, R10 | other (motorway) | - | 22 | 19 | 27 | - |
| Braehead Farm, Bargeddie W, R5 | other (motorway) | - | 36 | 25 | 39 | 38 |
| Johnston Farm, Gartcosh, R23 | other (motorway) | - | 24 | 20 | 22 | - |
| New Edinburgh Road, Uddingston, R27 | other (motorway) | - | 39 | 28 | 41 | 40 |
| Alpine Grove, Udingston, R28 | other (motorway) | - | 30 | 23 | 28 | 26 |
| Fallside Road, Uddingston, R29 | other (motorway) | - | 35 | 30 | 31 | 32 |
| Tinkers Lane, Motherwell | Roadside | - | - | - | - | 29 |
| Castlehill Road, Overtown | Roadside | - | - | - | - | 23 |
| Coatbridge, Bank Street II | Roadside | - | - | - | - | 45 |
| Mobile 1, QA | Background | - | - | - | - | 25 |
| Mobile 1, QA | Background | - | - | - | - | 23 |
| Mobile 1, QA | Background | - | - | - | - | 25 |
| Ravenscraig | other (motorway) | - | - | - | - | 20 |
| Delburn St Motherwell, R30 | Roadside | - | - | - | - | 25 |
| Merry St, Motherwell, R31 | Roadside | - | - | - | - | 40 |
| Main St, Chapellhall, R32 | Roadside | - | - | - | - | 32 |
| Main St, Chapelhall, R33 | Roadside | - | - | - | - | 35 |
| Shawhead RBT, Coatbridge, R34 | other (motorway) | - | - | - | - | 41 |

In general, measured concentrations in 2004 were equal to, or lower than concentrations measured in 2003, although a few sites recorded slight increases. Exceedences of the NAQS annual mean objective were measured at six monitoring sites:

- Auchenkilns roundabout, Cumbernauld (56µg/m$^3$);
- Showcase Cinema Carpark, R4 (formerly Braehead Farm), (40 µg/m$^3$);
- New Edinburgh Road, Uddingston, R27 (40 µg/m$^3$);
- Bank Street II, Coatbridge (45 µg/m$^3$);
- Shawhead roundabout, Coatbridge, R34 (41 µg/m$^3$); and
- Merry Street, Motherwell, R31 (40 µg/m$^3$).

In addition, high concentrations of $NO_2$ were recorded at Lauchope St, Chapelhall and the Civic Centre, Motherwell, both sites identified in the Detailed Assessment as requiring further monitoring. Diffusion tubes at Bank Street and Braehead Farm also measured significant $NO_2$ concentrations.

It was previously believed that the monitoring site at the Auchenkilns roundabout was located at a considerable distance (500m) from the nearest receptor and there was no concern regarding public exposure. However, a sensitive receptor has been identified at a distance of approximately 100m from the diffusion tube site and 200m from the roundabout. In addition, a new hotel has been constructed approximately 250m from the roundabout. There is, therefore, potential for exceedence of the 2005 annual mean objective for $NO_2$ at these sites. There are currently extensive roadworks being undertaken at Auchenkilns Roundabout, which are discussed further in Section 9.1. Further assessment and monitoring will be required at this site to determine the likelihood of an $NO_2$ annual mean exceedence.

What was Braehead Farm, Bargeddie, is now situated within the carpark for the Showcase Cinema complex. The diffusion tube is located in a quiet corner of the carpark, approximately 40m from the edge of the A8/M8 motorway. This receptor is therefore subject to emissions from the M8 and carpark emissions, which are often high due to slow moving vehicles and cold running engines. The principal emission source impacting on the monitoring site is however road traffic from the A8/M8. There are no receptors at the current monitoring site as the farmhouse was demolished as part of the cinema development, however the site provides an indication of likely $NO_2$ concentrations at locations within 40m of the A8/M8. A GIS analysis was conducted to identify any sensitive receptors within 50m of the M8, which would be subject to similar ambient concentrations. It found that there are some such receptors at Higherness Way, approximately 1km further along the A8/M8 to the east, shown in Figure 2. These receptors are between 30 and 50m from the motorway edge. Other diffusion tube sites within 50m of the motorway are Orchard Farm (R11) and Shawhead (R9). These sites measured 32µg/m$^3$ and 37µg/m$^3$ respectively in 2003 and 2004. It is likely that the receptors at Higherness Way will be subject to concentrations at similar levels to those measured at Shawhead. As such it is considered unlikely that annual mean $NO_2$ NAQS objective will be exceeded, however monitoring should be undertaken at these locations to confirm this.

The second Braehead Farm site, R5, also measured high $NO_2$ concentrations, but as it is located several hundred metres from the nearest sensitive receptor it does not represent a site of relevant exposure.

At New Edinburgh Road, Uddingston, an annual mean concentration of 40µg/m$^3$ was recorded, following a measurement of 41µg/m$^3$ in 2003. There is, therefore, potential for exceedence of the NAQS annual mean objective at this site. Further assessment of this site should therefore be undertaken.

An additional diffusion tube was installed in Bank Street, Coatbridge in late 2003 to expand $NO_2$ monitoring in an area which has consistently recorded high concentrations. The new site (Bank Street II) is located at a roadside site closer to sensitive receptors than the original monitoring site. In 2004 the original Bank Street site measured a annual average concentration of 37µg/m$^3$, however the new monitoring site recorded an annual average concentrations substantially above the NAQS objective level. Further assessment of road traffic emissions at Bank Street, Coatbridge is therefore required.

An exceedence of the NAQS objective was measured at a new site at Shawhead roundabout, R34, based on 6 months monitoring data. This site was established to supplement findings from an existing location, R9, which has recorded high concentrations since it was installed in 2001. R34 is located much closer to sensitive receptors than R9, which had no receptors nearby. This is shown in Figure 3. Further assessment will be necessary at a later date to determine whether the objective would be exceeded when 12 months monitoring data is available at the new monitoring site.

The site at Merry Street, Motherwell also commenced operation in mid 2004 and so has a low data capture rate. Since the short-term results do indicate a potential exceedence, data from this site will

continue to be monitored to determine if further assessment will be required. This will supplement automatic monitoring which is also undertaken at this site, and is discussed in the following section.

There were no exceedences at Lauchope Street, Chapelhall or Motherwell Civic Centre, two sites which had been identified in the Detailed Assessment as having the potential to exceed the annual mean objective. However, high concentrations of $NO_2$ were measured, and these sites will require continued monitoring and assessment. Automatic monitoring has been undertaken at both sites and is discussed in Section 2.2.

## 2.2 Automatic Monitoring

North Lanarkshire Council has expanded its automatic monitoring network since the Detailed Assessment with an additional two units, bringing its total number of automatic monitors to five. The units use real-time chemiluminescence analysers fitted with dual reaction chambers, which are suitable for measuring real-time $NO_2$ concentrations.

Monitoring locations were selected based on conclusions reached in the Detailed Assessment, so analysers were installed in identified pollution 'hotspots'. Sites were moved halfway through 2004, allowing monitoring to take place for approximately 6 months at each site. In all, monitoring was carried out at seven locations in 2004, which are described in Table 4, and shown in Figure 1.

*Table 4 Automatic monitoring sites and dates of operation in 2004*

| Monitoring Site | Location Type | Period of Operation | Period Data Capture Rate (%) |
|---|---|---|---|
| Calder Court, Coatbridge | Urban Background | Jan – Jun | 97 |
| Kirk o'Shotts | Roadside (M8) | Jan – May | 81 |
| Harthill | Roadside (M8) + Industrial | Jan – Dec | 94 |
| Motherwell Civic Centre | Roadside | Jul – Dec | 93 |
| Chapelhall | Roadside | Nov – Dec | 76 |
| Wishaw | Roadside | Jun – Dec | 92 |
| Motherwell Cross | Roadside | Jun – Dec | 81 |

With the exception of the Harthill site, for which a full year of data is available, monitoring was undertaken over shorter time periods. Concentrations measured using short term data can be adjusted to give an estimated annual average. An adjustment factor is calculated based on data from another local site with complete yearly data. In this case, the site chosen to calculate the adjustment factor is Glasgow Centre. The technique employed is that given in the technical guidance document LAQM.TG(03).

The results for annual concentration of $NO_2$ with adjustment factors applied and the maximum measured hourly mean concentrations are presented in Table 5.

*Table 5 Measured $NO_2$ concentrations at automatic sites in 2004*

| Monitoring Site | Monitoring period mean concentration (µg/m$^3$) | Maximum 1-hour mean concentration over monitoring period (µg/m$^3$) |
|---|---|---|
| Calder Court, Coatbridge | 26 | 129 |
| Kirk o'Shotts | 21 | 96 |
| Harthill | 23 | 146 |
| Motherwell Civic Centre | 23 | 100 |
| Chapelhall | 34 | 109 |
| Wishaw | 25 | 92 |
| Motherwell Cross | 39 | 174 |

With the exception of the Motherwell Cross site, the measured concentrations at each of the automatic monitoring stations are substantially below the NAQS annual mean and hourly mean objectives for $NO_2$. The measured concentrations are, excepting Chapelhall, six month averages, including three summer months and three winter months. The results therefore provide a reasonable approximation to the annual average concentrations, although some seasonal effects or yearly variations may occur.

No hourly concentrations exceeding 200µg/m$^3$ were measured at any of the sites. It is therefore considered unlikely that the NAQS hourly mean concentration will be exceeded at any of the monitoring locations.

Monitoring data is currently available until the end of March 2005, for Motherwell Civic Centre, Motherwell Cross and Chapelhall, the sites requiring further assessment after the Detailed Assessment. This 2005 data can be combined with all available data to calculate the mean concentration measured over the entire monitoring period. The results are presented in Table 6.

*Table 6 Mean concentration from all available monitoring data*

| Monitoring Site | Dates of monitoring | Mean Concentration (µg/m$^3$) |
|---|---|---|
| Chapelhall | Nov 04 – Mar 05 | 41 |
| Civic Centre | Jul 04 – Mar 05 | 26 |
| Motherwell Cross | Jun 04 – Mar 05 | 42 |

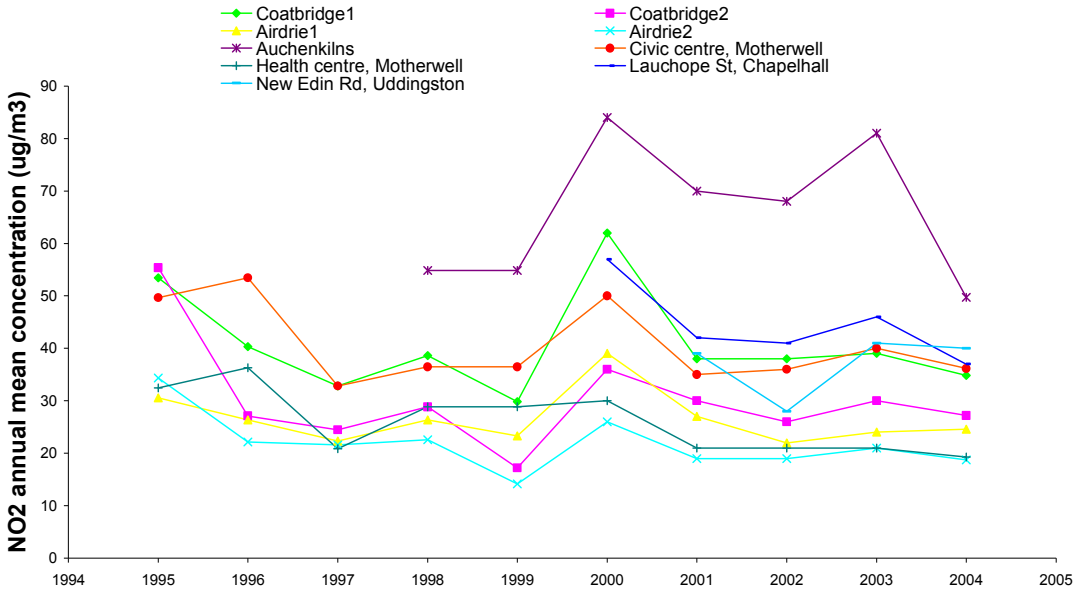
The measured mean concentrations at Chapehall and Motherwell Cross are therefore greater than the NAQS annual mean objective of 40µg/m$^3$. The measured concentrations at Motherwell Cross correlate well with the modelling predictions of $NO_2$ concentrations in the Detailed Assessment. The results therefore indicate that it is likely that the annual average NAQS objective for $NO_2$ will be exceeded in the vicinity of Motherwell Cross. A decision on the need to declare an AQMA at this location will be taken once a full year of monitoring data is available.

At Chapelhall, the measured average $NO_2$ concentration is less than the predicted concentration from the Detailed Assessment, however the measured concentrations still indicates an exceedence of the annual mean NAQS objective for $NO_2$ at Chapelhall. As with Motherwell Cross, a decision on the need to declare an AQMA at this location will be taken once a full year of monitoring data is available.

### 2.3 Long term $NO_2$ trends

Monitoring of $NO_2$ has taken place across North Lanarkshire Council using passive diffusion tubes for over 10 years. While the network has expanded considerably over the years, the original locations were usually in areas of high pollutant concentrations, and there is great interest in investigating how pollutant levels have varied over this time. Graph 1 displays $NO_2$ concentrations at selected locations since 1995.

*Graph 1 $NO_2$ concentrations in North Lanarkshire since 1995*




The trend in $NO_2$ concentrations in North Lanarkshire over the past 10 years is difficult to determine. Concentrations in 2004/05 are lower than they were in 1995, but are not particularly lower than concentrations measured in 1997. Concentrations in 1996 and 1997 did fall quite rapidly from the high levels of 1995, but since then have stabilised, with only slight variations each year since. At most sites, concentrations measured in recent years are still comparable to levels in the late 1990's.

Concentrations rose significantly at almost every site in 2000. This rise in concentration can be attributed to a change in laboratory analysis techniques which took place in this year. Meteorological conditions during the year can also cause elevated levels of $NO_2$. Typically, if stable conditions and low winds are prevalent, pollutant concentrations will be higher. Nationally, measured concentrations increased in 2003 as a result of meteorological conditions in that year. This is reflected in the measured concentrations within North Lanarkshire in 2003.

The highest variations in measured concentration have been experienced at Auchenkilns. Roadworks at the roundabout in recent years have led to a reduction in vehicle speeds around the roundabout which may explain the reasons for the large drop in measured concentrations between 2003 and 2004.

## 2.4 Conclusions

Annual mean concentrations of $NO_2$ in 2004 were generally lower than concentrations in 2003. Exceedences of the annual mean objective were measured at several sites across North Lanarkshire. All of these are locations which are strongly influenced by road traffic emissions and are sites where high concentrations have been measured in the past. They are:

- Chapelhall;
- Motherwell Cross;
- Bank Street, Coatbridge;
- New Edinburgh Road, Uddingston; and
- Auchenkilns Roundabout.

It is proposed that a full year of monitoring data be obtained at Chapelhall and Motherwell Cross before any decision is made with regard to the declaration of AQMAs. Both sites are located within areas that are in the process of being declared as AQMAs for $PM_{10}$.

It is considered that the measured concentrations at Bank Street, Coatbridge indicate a potential for exceedence of the annual mean NAQS objective. A Detailed Assessment will therefore be required of this location.

Further assessment of $NO_2$ concentrations and sensitive receptors at New Edinburgh Road, Uddington and Auchenkilns Roundabout will be required. It is considered that this should be undertaken as an addendum to the Progress Report whilst the Detailed Assessment at Bank Street, Coatbridge is undertaken.

It is not expected that there will be any exceedences of the 1-hour objective at any site in North Lanarkshire.

# 3 SULPHUR DIOXIDE

North Lanarkshire Council's Detailed Assessment of $SO_2$ concluded that it was unlikely that any exceedences of the NAQS objectives for $SO_2$ would occur within North Lanarkshire.

Monitoring of $SO_2$ has continued across North Lanarkshire using both automatic ultra-violet (UVF) analysers and bubbler samplers. Site locations are shown in Figure 4. Measured $SO_2$ concentrations during 2004 are discussed in Sections 3.1 and 3.2.

## 3.1 $SO_2$ active sampler monitoring

North Lanarkshire Council monitor $SO_2$ using 8-port active samplers (bubblers) at three locations, Kirkwood and Main Street, both Coatbridge, and at Muirhead. Analysis is undertaken by Glasgow Scientific Services, using the net acidity titration technique. There are no procedures in place to validate the results.

SO2 bubblers monitor over 24-hour periods, therefore Technical guidance LAQM.TG(03) provides correction factors to adjust 24-hour mean concentrations, allowing comparison with hourly and 15-minute mean objectives. The correction factors are:

- $99.9^{th}$ %ile of 15-minute means = 1.8962 x maximum daily mean
- $99.7^{th}$ %ile of 1-hour means = 1.3691 x maximum daily mean

The correction factors have been utilised where appropriate and the results presented in Table 7.

*Table 7 $SO_2$ Concentrations measured in North Lanarkshire*

| | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| Muirhead | | | | | |
| Maximum 24hour Mean Concentration ($\mu g/m^3$) | 46 | 128 | 126 | 55 | 47 |
| $99.7^{th}$ %ile of 1-hour Means ($\mu g/m^3$) | 63 | 175 | 172 | 75 | 64 |
| $99.9^{th}$ %ile of 15-minute Means ($\mu g/m^3$) | 87 | 243 | 239 | 104 | 89 |
| Coatbridge Kirkwood | | | | | |
| Maximum 24hour Mean Concentration ($\mu g/m^3$) | 50 | 60 | 47 | 54 | 49 |
| $99.7^{th}$ %ile of 1-hour Means ($\mu g/m^3$) | 68 | 82 | 64 | 74 | 67 |
| $99.9^{th}$ %ile of 15-minute Means ($\mu g/m^3$) | 95 | 114 | 89 | 102 | 93 |
| Coatbridge Main Street | | | | | |
| Maximum 24hour Mean Concentration ($\mu g/m^3$) | 105 | 61 | 57 | 57 | 50 |
| $99.7^{th}$ %ile of 1-hour Means ($\mu g/m^3$) | 144 | 84 | 78 | 78 | 68 |
| $99.9^{th}$ %ile of 15-minute Means ($\mu g/m^3$) | 199 | 116 | 108 | 108 | 95 |

Measured $SO_2$ concentrations were lower in 2004 than 2003 at all sites. This continues the general trend of declining $SO_2$ concentrations which has been apparent since 2001.

It is unlikely that there will be any exceedences of the NAQS objectives in areas where monitoring was undertaken. These areas are typical of urban areas with no industrial emitters or large boilers, and low numbers of houses burning solid fuel. It is unlikely that any exceedences of the $SO_2$ objectives will occur in similar areas across North Lanarkshire.

### 3.2 UVF Analyser Monitoring

North Lanarkshire Council also monitor $SO_2$ using three automatic monitoring stations, two mobile and one stationary. These are operated by Horiba and contain real-time UVF analysers.

The stationary site is situated within residential accommodation at New Town Hall, Bron Way, Cumbernauld, an urban background monitoring site. The mobile monitoring stations were been located at roadside locations to monitor for $NO_2$ and $PM_{10}$ during 2004, as such there were no significant $SO_2$ emissions.

One mobile unit was located at the Civic Centre, Motherwell for a 6 month period while the other was stationed at Harthill, next to the M8, for 12 months. The results gathered from the three sites in 2004 are given in Table 8.

*Table 8 $SO_2$ Concentrations measured within North Lanarkshire in 2004 by Automatic Analysers*

| Monitoring Location | 99.9th percentile of 15min mean concentrations (µg/m3) | 99.79th percentile of 1hour mean concentrations (µg/m3) | 99.17th percentile of 24hour mean concentrations (µg/m3) |
|---|---|---|---|
| Bron Way, Cumbernauld | 45 | 40 | 14 |
| Harthill | 57 | 20 | 8 |
| Motherwell Civic Centre | 35 | 40 | 14 |

Measured $SO_2$ concentrations at the automatic monitoring sites in 2004 were therefore substantially below NAQS objective levels. Even though data was not collected for a full year at all sites, it is considered unlikely that there will be any exceedences of the NAQS objectives. No exceedences of NAQS objectives for $SO_2$ were recorded at any of the monitoring sites between 2000 and 2003.

The monitoring station at Harthill has now been relocated to Salsburgh to measure ambient air quality resulting from domestic coal burning whilst the UVF monitor from Motherwell Civic Centre is in the process of being relocated to measure $SO_2$ concentrations at locations close to Motherwell train depot.

### 3.3 Conclusions

Monitoring data has indicated that it is unlikely that any exceedences of NAQS objectives for $SO_2$ will occur within North Lanarkshire. Concentrations at all monitoring sites are low, considerably below the objective standards.

Automatic monitors have been relocated, or in the process of being relocated to areas identified in the U&SA. Further assessment of these areas will be undertaken when a complete dataset of results are available.

# 4 PARTICULATES ($PM_{10}$)

The Detailed Assessment concluded that that exceedences of the annual mean objective of $PM_{10}$ would occur in 2010 at the following road junctions:

- junction of A723 Hamilton Rd. and A721 West Hamilton St./Muir St., Motherwell (Motherwell Cross);
- junction of A721 Windmillhill St. and B754 Airbles Rd., Motherwell (Civic Centre);
- junction of A725 Whifflett St. and B753 Calder St./School St., Coatbridge (Whifflett);
- junction of A73 and B799 Main Street, Chapelhall (Chapelhall);

The Detailed Assessment also concluded that it was likely that the annual average $PM_{10}$ concentration would exceed 18µg/$m^3$ in Salsburgh during 2010 although further monitoring was required to confirm this.

Monitoring undertaken at each of these locations since the Detailed Assessment and at other locations throughout North Lanarkshire are discussed in Section 4.1.

## 4.1 $PM_{10}$ Monitoring Data

Since the Detailed Assessment the number of automatic $PM_{10}$ monitors has increased, with four automatic monitoring stations now available. The stations monitor $PM_{10}$ continuously using Tapered Element Oscillating Microbalance (TEOM) units providing real-time continuous readings. The monitoring stations are provided, maintained and calibrated annually by Horiba.

Following the Detailed Assessment, the units were relocated to monitor at sites identified as having potential for exceedences of the 2010 annual mean objective. These include the junctions at Chapelhall, Motherwell Civic Centre and Motherwell Cross. The automatic monitoring would provide more accurate information on pollutant concentrations to allow more sophisticated assessment. Site descriptions are given in Table 9 and can be seen in Figure 5.

*Table 9 Automatic monitoring sites and dates of operation*

| Monitoring Site | Location Type | Period of Operation | Period Data Capture Rate (%) |
|---|---|---|---|
| Calder Court, Coatbridge | Urban Background | Jan - Jun | 96 |
| Kirk o' Shotts | Roadside (M8) | Jan - May | 84 |
| Harthill | Roadside (M8) + Industrial | Jan - Dec | 91 |
| Motherwell Civic Centre | Roadside | Jul - Dec | 92 |
| Chapelhall | Roadside | Nov - Dec | 100 |
| Motherwell Cross | Roadside | Jun - Dec | 82 |

The site at Calder Court, Coatbridge was relocated to Chapelhall during the Summer of 2004. The need to refit the analyser into a smaller unit meant that there were a few months of operational downtime. The monitoring site at Kirk o'Shotts was relocated to Motherwell Civic Centre and a new monitoring station was installed at Motherwell Cross in June 2004.

Monitoring continued at Harthill, a site adjacent to Tams Loup quarry and the M8 motorway, during 2004 although the site was relocated to Salsburgh village in March 2005.

With the exception of Harthill, monitoring was therefore undertaken over time periods shorter than a year during 2004. The mean concentration over the averaging period may not reflect the likely annual average concentration due to seasonal variations in concentration. Short term data can therefore be adjusted to give an estimated annual average based on data from another local site with complete yearly data. In this case, the site chosen to calculate the adjustment factor is Glasgow Centre. The Harthill site was not considered appropriate for use in adjusting the concentration as industrial (quarrying) emissions will effect the measured concentration. Measured concentrations have therefore been adjusted using the technique given in technical guidance LAQM.TG(03).

The annual average concentration and the number of exceedences of the 24-hour mean objective recorded at each site during 2004 are reported in Table 10. The concentrations have been factored by 1.3 to account for the under-read of TEOM analysers, and the adjustment factor applied where appropriate.

*Table 10 Automatic $PM_{10}$ Monitoring Results, 2004*

| Monitoring Site | Annual Mean Concentration (µg/m$^3$) | Maximum 24-hour Mean Concentration (µg/m$^3$) | 98$^{th}$ % of 24-hr Mean Exceedences (µg/m$^3$) |
|---|---|---|---|
| Calder Court | 19 | 45 | 36 |
| Civic Centre | 13 | 37 | 27 |
| Harthill | 19 | 86 | 48 |
| Kirk o' Shotts | 15 | 53 | 39 |
| Chapelhall | 9 | 35 | 32 |
| Motherwell Cross | 13 | 37 | 27 |

Exceedences of the 2010 $PM_{10}$ annual objective were recorded at Calder Court, Coatbridge and at Harthill. There were no exceedences of the 24 hour mean objective measured at any site, although the results from Harthill approached the objective. These measured concentrations are consistent with previous years results indicating exceedence of the NAQS objective.

The measured concentrations at Motherwell Civic Centre and Motherwell Cross, two sites at which AQMAs are being declared for $PM_{10}$ were substantially below the 2010 annual mean objective level of 18µg/m$^3$. The measured concentration at Chapelhall was also substantially below the 2010 NAQS objective level. These concentrations may have been as a result of the seasons over which monitoring was undertaken. Further assessment will therefore be required when a fuller monitoring dataset is available.

*2005 Monitoring Data*

In order to obtain further confidence in the monitoring data at Motherwell Civic Centre, Motherwell Cross and Chapelhall the measured data for the three sites up to April 2005 has been obtained, allowing a mean to be calculated from the maximum data available. The results are not directly comparable against the calendar annual mean objective, but do nonetheless, provide a good indication of long term concentrations. These results are presented in Table 11.

*Table 11 Annual mean concentrations using all available data*

| Monitoring site | Dates of monitoring | Mean concentration (µg/m$^3$) |
|---|---|---|
| Chapelhall | Nov 04 – Mar 05 | 18 |
| Civic Centre | Jul 04 – Mar 05 | 12 |
| Motherwell Cross | Jun 04 – Mar 05 | 16 |

The mean concentrations across the longer monitoring period are higher than those for 2004 data only at Chapelhall and Motherwell Cross. The results indicate potentially high $PM_{10}$ concentrations in Chapelhall and at Motherwell Cross.

Further assessment of $PM_{10}$ concentrations at these sites will be undertaken following the declaration of AQMAs within North Lanarkshire.

A further background monitoring station was added to the monitoring network in March 2005. An automatic TEOM analyser and gravimetric Partisol analyser were located at an urban background site in Motherwell. The site will provide and accurate background concentration for the Motherwell area and will also provide some collocation data between TEOM and gravimetric samplers from which the accuracy of the 1.3 adjustment factor for TEOM monitoring results can be assessed. Insufficient data is available to date to allow meaningful assessment, however the results will be published when data is available.

### 4.2 Long term $PM_{10}$ trends

Since the $PM_{10}$ monitoring stations have not remained in the same locations for long term (several years) periods, it is not therefore possible to accurately assess long term trends in $PM_{10}$ concentrations. It is clear, however, that since the year 2000, exceedences of the 2010 $PM_{10}$ annual mean objective have been recorded at a variety of sites. While not as common, occasional exceedences of the 2010 24-hour mean objective have also been noted. Historical measurements of $PM_{10}$ are summarised in Table 12.

| Year | Monitoring Site | Annual Mean Concentration (µg/m$^3$) | No. of Measured Exceedences of the 24-hour Mean Objective |
|---|---|---|---|
| 2000 | Calder Court | 18 | 5 |
| | Croy | 14 | 0 |
| | Motherwell Civic Centre | 14 | 0 |
| | Stepps | 23 | 0 |
| | Auchenkilns | 15 | 0 |
| | Greengairs | 24 | 0 |
| 2001 | Calder Court | 17 | 5 |
| | Croy | 27 | 25 |
| | Motherwell Civic Centre | 19 | 6 |
| | Greengairs | 24 | 1 |
| 2002 | Calder Court | 16 | 2 |
| | Croy | 20 | 6 |
| | Kirk o'Shotts | 16 | 1 |
| | Harthill | 19 | 0 |
| 2003 | Calder Court | 20 | 6 |
| | Croy | 18 | 5 |
| | Kirk o'Shotts | 25 | 5 |
| | Harthill | 21 | 14 |

Monitoring data for Croy and Greengairs in particular indicates potential exceedence of the NAQS annual mean objective in 2010. Further consideration of these sites will be required during 2006.

In comparison with 2003, concentrations of $PM_{10}$ have declined through 2004. All monitoring sites in 2003 registered exceedences of the 2010 annual mean, with an additional exceedence of the 2010

24-hour mean objective at Harthill. In 2004, exceedences were measured at 2 out of 6 sites where monitoring took place. Of these, monitoring only took place during both years at Harthill, where the annual mean dropped by 2µg/$m^3$, and the 24-hour objective was not breached in 2004.

### 4.3 Conclusions

Annual mean concentrations of $PM_{10}$ in 2004 were generally lower than concentrations in 2003 although the results could not be directly compared. The measured concentrations at the four road junctions at which AQMAs are currently being declared were varied.

The measured mean $PM_{10}$ concentration at Calder Court, Coatbridge was consistent with the findings of the Detailed Assessment and previous years of monitoring indicating exceedence of the NAQS annual mean objective in 2010. The measured mean concentration at Chapelhall was also consistent with the conclusions of the Detailed Assessment although a more complete monitoring dataset will be required to confirm this.

At Motherwell Cross the mean concentration from June 2004 to April 2005 was below the NAQS objective level, although the results indicated seasonal variations in measured concentration. Further assessment of this site will be required when a years monitoring data is available. Similarly, monitoring data at Motherwell Civic Centre indicates that exceedence of the NAQS objectives is unlikely as the measured mean concentration is substantially below the NAQS objective level.

Exceedences of the annual mean objective was measured at Harthill, a site influenced by road traffic and quarrying emissions. The measured concentrations in 2004 are consistent with previous monitoring results and as such it is considered that there is potential for an exceedence of the NAQS annual mean objective. Furthermore, exceedences of the 24-hour mean objective have also been measured. Further assessment of this location is required, therefore it is proposed to undertake a Detailed Assessment of $PM_{10}$ at Harthill.

Further assessment of $PM_{10}$ concentrations at Croy and Greengairs is required and monitoring should be scheduled for 2006.

# 5 CARBON MONOXIDE

Carbon monoxide (CO) is produced by the incomplete combustion of organic substances. The main source of CO is from vehicle emissions.

The U&SA of CO carried out by North Lanarkshire Council concluded that it was unlikely that there would be an exceedence of air quality objectives for carbon monoxide.

Monitoring of CO is carried out using an automatic infra-red analyser which is contained within one of their mobile units. In 2004, this unit was located at Harthill, adjacent to the M8 motorway. Measurements of running 8-hour mean concentrations are recorded, the results of which are given in Table 12.

*Table 12 CO monitoring results from Harthill, 2004*

| Location | Maximum 8-hr mean ($mg/m^3$) | Air Quality Objective 8-hr mean ($mg/m^3$) |
|---|---|---|
| Harthill | 0.7 | 10 |

The maximum 8-hour mean measured at the Harthill site is significantly less than the NAQS objective for CO. This is consistent with previous years monitoring. As the Harthill site is situated close to the M8 motorway, it is likely that the CO concentrations measured here will as high as at roadside sites across North Lanarkshire.

As such, it is considered unlikely that any exceedences of the NAQS objectives for CO will occur in North Lanarkshire.

# 6 BENZENE

Benzene is an additive to vehicle fuel. The majority of emissions of benzene come from petrol vehicle exhausts.

The U&SA of air quality within the North Lanarkshire Council area concluded that it was unlikely that there would be an exceedence of air quality objectives for benzene.

North Lanarkshire Council do not undertake monitoring of benzene. Previously, results were taken from a national network monitoring site at Edinburgh Medical School, an Urban Background site in Edinburgh. However, this site ceased monitoring for benzene in mid 2002. The next nearest site to measure benzene is Glasgow Kerbside, which is situated on a road with extremely high traffic levels. The maximum running annual mean concentrations measured at the site from 2003 and 2004 are presented in Table 13.

*Table 13 Monitoring of benzene at Glasgow Kerbside, 2003-04*

| Concentration | 2003 | 2004 |
|---|---|---|
| Maximum running annual mean Benzene concentration ($\mu g/m^{3)}$ | 2.03 | 1.83 |

While these results will not be representative of many locations in North Lanarkshire, it is highly unlikely that any North Lanarkshire sites would have higher ambient concentrations of benzene than Glasgow Kerbside. Since there are no exceedences of the NAQS objectives for benzene at Glasgow Kerbside, it is considered unlikely that there would be any exceedences at any site in North Lanarkshire.

# 7 1,3 BUTADIENE

The primary sources of 1,3-butadiene are from vehicle emissions and industrial processes. Catalytic converters remove a high percentage of emissions of 1,3-butadiene from motor vehicles.

The U&SA of 1,3 Butadiene by North Lanarkshire Council concluded that it was unlikely that there would be an exceedence of air quality objectives for 1,3-butadiene. The Scottish Executive accepted this conclusion.

North Lanarkshire Council do not undertake monitoring of 1,3 Butadiene. Previously, results were taken from a national network monitoring site at Edinburgh Medical School, an Urban Background site in Edinburgh. However, this site ceased monitoring for 1,3 Butadiene in mid 2002. The next nearest site to measure 1,3 Butadiene is Glasgow Kerbside, which is situated at a road with extremely high traffic levels. The maximum running annual mean concentrations measured at the site from 2003 and 2004 are presented in Table 14.

*Table 14 Monitoring of 1,3 Butadiene at Glasgow Kerbside, 2003-04*

| Concentration | 2003 | 2004 |
|---|---|---|
| Maximum running annual mean 1,3 Butadiene concentration (µg/m$^{3)}$ | 0.43 | 0.43 |

While these results will not be representative of many locations in North Lanarkshire, it is highly unlikely that any North Lanarkshire sites would have higher ambient concentrations of 1,3 Butadiene than Glasgow Kerbside. Since there are no exceedences of the NAQS objectives for 1,3 Butadiene at Glasgow Kerbside, it is considered unlikely that there would be any exceedences at any site in North Lanarkshire.

## 8 LEAD AND HEAVY METALS

Since the addition of lead to petrol was banned in 2000, the principal source of lead is from industrial emissions.

The U&SA of lead by North Lanarkshire Council concluded that it was unlikely that there would be an exceedence of air quality objectives for lead.

North Lanarkshire Council undertake monitoring for lead at Motherwell, a national network batch monitoring site. The Motherwell monitoring site is situated on the roof of the Civic Centre building approximately 500m from a large steel mill and is adjacent to the A721, Motherwell to Wishaw road.

In addition, monitoring of other heavy metals is undertaken at this site. While these are not included in the NAQS as yet, some of these may be included in the strategy in the future. They are therefore included in this Progress Report.

Monitoring result for lead are displayed in Table 15, and those for the other heavy metals are given in Table 16.

*Table 15 Monitored lead concentrations at Motherwell, 2002 – 2004*

| | 2002 | 2003 | 2004 |
|---|---|---|---|
| Annual mean lead-in-air concentration (µg/m$^3$) | 0.012 | 0.010 | 0.012 |

*Table 16 Monitored heavy metal concentrations at Motherwell, 2002 – 2004*

| Annual average concentrations (ng/m$^3$) | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|
| Arsenic | | | | 0.8 | 0.63 |
| Cadmium | 0.3 | 0.5 | 0.4 | 0.2 | 0.1 |
| Chromium | 7.0 | 17.0 | 5.2 | 2.6 | 2.1 |
| Copper | 6.8 | 16.0 | 7.0 | 8.8 | 6.9 |
| Iron | 304.0 | 533.0 | 223.6 | 229.8 | 244.3 |
| Mercury | | | | 0.0 | 0.1 |
| Manganese | 6.1 | 9.7 | 4.1 | 4.3 | 4.1 |
| Nickel | 3.0 | 2.6 | 1.3 | 0.9 | 0.7 |
| Platinum | | | | <0.01 | <0.01 |
| Vanadium | 1.3 | 2.1 | 1.2 | 1.6 | 1.1 |
| Zinc | 12.0 | 35.0 | 15.1 | 16.3 | 20.0 |

The annual mean lead-in-air concentrations measured at Motherwell have been significantly below the NAQS objective level in the years 2002 to 2004. This correlates to concentrations measured in years before 2002, where lead concentrations were also low. It is unlikely that there would be any exceedences of the NAQS objective for lead.

There are proposed air quality standards for arsenic, cadmium and nickel under the fourth EU Daughter Directive regarding air quality. These have not yet been adopted under the UK NAQS. The targets are expressed in ng/m$^3$ as the content contained within the $PM_{10}$ fraction averaged over the calendar year, and are outlined in Table 17

*Table 17 EU targets for Arsenic, Nickel and Cadmium*

| Pollutant | Arsenic | Nickel | Cadmium |
|---|---|---|---|
| Target value (ng/m$^3$) | 6 | 20 | 5 |

It is clear that concentrations being measured at Motherwell are comfortably below these objectives. There are no targets for the other heavy metals measured at Motherwell, but it is unlikely that they are of a level of concern.

# 9 NEW DEVELOPMENTS

New developments which may have an effect on air quality are to be considered in the Progress Report. Following the guidance LAQM.PRG(03), these developments are noted for possible further assessment in the next round of review and assessment.

There are a wide range of developments which can have an effect on air quality, both positively and negatively. Information on types of developments are found in a National Society for Clean Air (NSCA) guidance booklet (Reference 5). These include the building of a new industrial process or a new motorway. Other developments which may impact on air quality include developments such as supermarkets with large car parks, airport expansions or residential developments within air quality management areas.

In addition, the impact of these developments on exposure must also be considered. For example, a new bypass may move traffic from a heavily congested, residential area of a city, taking it out of town to an area with no sensitive receptors. Conversely, a low-polluting development in an area where poor air quality already exists may result in an increase in exposure.

## 9.1 M80 Stepps to Haggs upgrade

Work is currently underway to upgrade sections of the A80 between Stepps and Haggs. Much of this will occur in the North Lanarkshire Council region, including the widening the section between Mollinsburn and Auchenkilns , Auchenkilns and Haggs and a new two lane bypass of Moodiesburn.

An environmental statement produced on behalf of the Scottish Executive concluded that the planned upgrades would have both a beneficial and adverse effect on air quality in areas in the vicinity of the route. It concludes that more locations would benefit from improved air quality than those where the standard of air quality would decline. It further concludes that no exceedences of any air quality standards would occur as a result of the development.

## 9.2 Proposed supermarket development in Motherwell and Wishaw

A proposal to develop a new supermarket in Motherwell town centre, at a site adjacent to the proposed AQMA, has been received. The development would be likely to result in increased traffic volume on roads surrounding the site, and as such may have an adverse impact on local air quality. No details of the development were available at the time of compiling this report, however local air quality in this area will be assessed further prior to the development.

Similarly, a large supermarket is planned for Wishaw town centre. It is likely that the development will result in increased traffic volume on roads surrounding the site, and as such may have an adverse impact on local air quality. Further assessment of local air quality will again be required prior to the development of the site.

## 9.3 Industrial Processes

Existing industrial processes can have an impact on air quality should there be any significant changes to their emissions to air. The SEPA public register was examined to determine if there were any new regulated processes or if any regulated processes had varied emissions considerably since the last round of Review and Assessment.

Argent Energy manufacture biodiesel fuel at Biggar Road, Motherwell, and were licensed under Pollution Prevention and Control (Scotland) Regulations 2000 (PPC) in December 2003. This license was varied in January 2005, with conditions relating to emissions to air specified. Assessment of emissions to air was undertaken as part of the PPC submission by Argent Energy. The assessment concluded that emissions from the site would contribute to maximum annual average ground level concentrations for $NO_2$ and $PM_{10}$ of <0.5µg/$m^3$.

The neighbouring site, William Forrest & Son, submitted a PPC application for the disposal of animal carcasses and waste by means other than incineration, in 2004. The application is currently under consideration by SEPA, who have requested further information to be supplied before a license can be issued. An environmental assessment was carried out to support the application and considered a number of different operational scenarios and emissions. The assessment concluded that under certain operational conditions (use of heavy fuel oil in boiler), there may be exceedences of the NAQS objective for $SO_2$. Based on modelling predictions there is potential for exceedence of the 2010 annual mean objective for $PM_{10}$ regardless of the operational conditions, although the 2004 objective was predicted to be met. Predicted $NO_2$ concentrations may also exceed the 1-hour NAQS objective during certain operational conditions.

There is therefore potential for exceedence of the NAQS objectives for $PM_{10}$ and $NO_2$ and $SO_2$ under certain operational conditions in the vicinity of Argent Energy and William Forrest & Son. Further consultation with SEPA will be required in relation to these potential exceedences and permitted emissions conditions.

## 10 DOMESTIC FUEL EMISSIONS

The U&SA for North Lanarkshire concluded that there was a potential for exceedences of the NAQS objectives for $PM_{10}$ and $SO_2$ in Greengairs due to the high number of residential properties burning solid fuel. A dispersion modelling study was carried out to assess the impact of these emissions.

North Lanarkshire Council officers carried out a fuel use survey in Greengairs and the neighbouring village of Wattston. This gathered information on quantities of fuel combusted annually, which was used to calculate the emission rates of each pollutant.

A detailed description of the modelling methodology is given in Annex 1, with the conclusions of the assessment outlined below.

No exceedences of any $SO_2$ objectives were predicted by the dispersion modelling study. The maximum predicted concentrations in the modelled domain were the equivalent of 26% of the 24-hour objective, 26% of the 1-hour objective and 51% of the 15-minute objective.

No exceedences of the $PM_{10}$ objectives were predicted by the study. The maximum predicted concentration for the $PM_{10}$ annual mean in 2010 was 17.69µg/$m^3$. The maximum predicted 24-hour mean concentration was less than 50% of the objective.

As a result, it is concluded that it is unlikely that there will be any exceedences of the NAQS objectives for $PM_{10}$ or $SO_2$ in Greengairs or Wattston.

## 11 RAILWAY EMISSIONS

The U&SA concluded that there could be exceedences of the 15-minute objective for $SO_2$ as a result of emissions from diesel trains at freight depots in Motherwell and Coatbridge.

A site visit to the Coatbridge depot was made by North Lanarkshire Council officers and a consultant from BMT Cordah. It was determined that diesel locomotives did not operate in this depot, with all locomotives being electric, and so there would be no emissions of $SO_2$.

The Motherwell depot is not electrified, so there is considerable movement of diesel engines. Concern over exceedences of the 15-minute mean exists particularly when stationary engines are refuelling with the engine idling.

No emissions data could be obtained for idling locomotives. A dispersion modelling study was undertaken of a nominal emission to determine the spatial distribution of emissions and determine the potential for impacting on neighbouring residential properties. A contour plot of emissions from the site with respect to neighbouring residential areas is provided in Figure 13.

A monitoring study is planned at receptors surrounding the depot, although the Council are having difficulty agreeing a suitable site with nearby landowners. The site will be targeted at the area identified as being subject to the worst impact from railway emissions in order to provide worst-case assessment of $SO_2$ concentrations. These results will be commented upon once available.

## 12 CONCLUSIONS

Monitored pollutant concentrations during 2004 were generally lower than concentrations in 2003.

Exceedences of the annual mean $NO_2$ objective were measured at several sites across North Lanarkshire at locations which are strongly influenced by road traffic emissions and are sites where high concentrations have been measured in the past. These were:

- Chapelhall;
- Motherwell Cross;
- Bank Street, Coatbridge;
- New Edinburgh Road, Uddingston; and
- Auchenkilns Roundabout.

The Chapelhall and Motherwell Cross sites are both located within proposed AQMAs for $PM_{10}$, therefore further assessment of these sites will be undertaken as part of the post-declaration Further Assessment.

It is considered that the measured concentrations at Bank Street, Coatbridge indicate a potential for exceedence of the annual mean NAQS objective. A Detailed Assessment will therefore be required of this location. Further assessment of $NO_2$ concentrations and sensitive receptors at New Edinburgh Road, Uddington and Auchenkilns Roundabout will be required. It is considered that this should be undertaken as an addendum to the Progress Report whilst the Detailed Assessment at Bank Street, Coatbridge is undertaken.

It is not expected that there will be any exceedences of the 1-hour objective at any site in North Lanarkshire.

Monitoring of $PM_{10}$ in 2004 focussed around the four road junctions at which AQMAs are proposed. The measured mean $PM_{10}$ concentration at Calder Court, Coatbridge was consistent with the findings of the Detailed Assessment and previous years of monitoring indicating exceedence of the NAQS annual mean objective in 2010. The measured mean concentration at Chapelhall was also consistent with the conclusions of the Detailed Assessment although a more complete monitoring dataset will be required to confirm this.

At Motherwell Cross the measured mean concentration was below the NAQS objective level, although the results indicated seasonal variations in measured concentration. Further assessment of this site will be required when a years monitoring data is available. Similarly, monitoring data at Motherwell Civic Centre indicates that exceedence of the NAQS objectives is unlikely as the measured mean concentration is substantially below the NAQS objective level.

Exceedences of the annual mean $PM_{10}$ objective were measured at Harthill, a site influenced by road traffic and quarrying emissions. The measured concentrations in 2004 are consistent with previous monitoring results and as such it is considered that there is potential for an exceedence of the NAQS annual mean objective. Furthermore, exceedences of the 24-hour mean objective have also been

measured. Further assessment of this location is required, therefore it is proposed to undertake a Detailed Assessment of $PM_{10}$ at Harthill.

Further assessment of $PM_{10}$ concentrations at Croy and Greengairs is required and monitoring should be scheduled for 2006.

Measured concentrations of the remaining pollutants were substantially below NAQS objectives, therefore no further assessment is required.

A number of new developments were identified with potential to result in negative impacts to local air quality. Two supermarket developments, in Motherwell and in Wishaw, were identified, each likely to result in increased traffic flows and thus pollutant concentrations. Further assessment of these locations will be required prior to development.

An industrial processor, William Forrest & Son, situated near Motherwell, was identified as having potential to result in exceedence of NAQS objectives for $NO_2$, $PM_{10}$ and $SO_2$ under certain operational conditions. Further consultation will be required with SEPA on the emissions from the site and the likelihood of exceedence of NAQS objectives.

No other significant emission sources were identified, therefore based on the available information the conclusions of the Detailed Assessment remain valid, although there is potential for early revocation of AQMA at Motherwell Civic Centre. Detailed Assessments are required for Bank Street, Coatbridge and at Tams Loup quarry, Harthill.

## 13 REFERENCES

Reference 1 Part IV of the Environment Act 1995 Local Air Quality Management Technical Guidance, LAQM.TG(03), DEFRA, January 2003

Reference 2 LAQM Updating and Screening Assessment for North Lanarkshire Council, BMT Cordah report ref. NLC.003, April 2003

Reference 3 LAQM Detailed Assessment for North Lanarkshire Council, BMT Cordah report ref. NLC.004, April 2004

Reference 4 Part IV of the Environment Act 1995 Local Air Quality Management Progress Report Guidance, LAQM.PRG(03), DEFRA, December 2003

Reference 5 Development Control: Planning for Air Quality, National Society for Clean Air, November 2004

*Annex 1*

# Assessment of Domestic Fuel Burning Emissions in Greengairs