Air Quality Updating and Screening Assessment for Magherafelt District Council

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management

May 2009

Local Authority Officer	Mr Robert Beattie Assistant Chief EHO

Department	Environmental Health Department
Address	Magherafelt District Council 50 Ballyronan Road Magherafelt BT45 6EN
Telephone	(028) 79397979
e-mail	r.beattie@magherafelt.gov.uk

Report Reference number	05/09
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Executive Summary

Funding continues to be received from Department of the Environment to carry out monitoring of nitrogen dioxide on an on-going basis in order to monitor trends over time and validate the conclusions drawn from previous reviews.

The overarching objective of the monitoring activity is to maintain or improve human health. This objective to date has been achieved in sites 3 - 8 as data collected confirms that levels of this pollutant met the standards set.

Results for site 1 have shown a clear exceedence and so the area concerned has been re-assessed. As a result this department provided an additional tube (site 8), from 4th September 2008, in the vicinity of the nearest residential property for comparison purposes. Results to date show that levels of this pollutant meet with standards set. Monitoring will therefore cease at site 1 as properties in the vicinity of this tube are now commercial or available for commercial use.

Based on monitoring data for 2008, it is evident that concentrations measured at site 2 are now exceeding the standard set. It is therefore the intention of this department to progress to a Detailed Assessment for this site.

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1 Introduction

1.1 Description of Local Authority Area

The district of Magherafelt is located in the centre of Northern Ireland, stretching from Lough Neagh and the river Bann in the east, into the Sperrin mountains in the west and is divided by the Moyola river.

Magherafelt is a strategically located district within Northern Ireland. It lies on the axis of the main A29 north-south route and the east-west M2/A6 Euro-route and is within 45 minutes drive of major airports and main harbours.

Historically, agriculture has been the cornerstone of the area's economy and agribusiness remains a vital contributor today with an increasing number of food processing and manufacturing facilities. Over the past few decades the economic base has expanded and the area now boasts strong construction and manufacturing industries encompassing domestic, agricultural and industrial sectors together with related businesses in engineering and timber. Mineral extraction significantly exploits the natural resources of the area. The largest number of employees in the area are involved in the service sector.

Magherafelt District Council area covers approximately 217 square miles and has a population of almost 40,000. 20% (8,000) live in Magherafelt town; 25% (10,000) live in other towns and villages within the Council area and the remaining 55% (21,000) live in the countryside.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in Northern Ireland are set out in the Air Quality Regulations (Northern Ireland) 2003, Statutory Rules of Northern Ireland 2003, no. 342, and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in Northern Ireland.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene			
	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	3.25 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Magherafelt District Council in February 2001 submitted a "1st Stage Review and Assessment of Air Quality". Using DETR guidance documents, the Review and Assessment considered pollutants of concern to determine whether or not a Second Stage Review and Assessment was required. The results of the 1st Stage Review and Assessment are summarised below.

POLLUTANT	**2ND STAGE REVIEW AND ASSESSMENT NEEDED**
Carbon Dioxide	No
Benzene	No
1,3 Butadiene	No
Lead	No
Nitrogen Dioxide	Yes
Sulphur Dioxide	Yes
PM_{10}	Yes

A "2nd Stage Review and Assessment of Air Quality" was submitted in April 2004. The pollutants highlighted above were subject to further scrutiny and the conclusion of the report in part prepared by NETCEN was that there was no need to proceed to a Stage 3 Review and Assessment for SO_2, NO_2 or PM_{10}.

A "Progress Report on Air Quality Management" was submitted in April 2005. A previous NETCEN report predicted exceedence of the air quality objective for nitrogen dioxide in 2005 at site 6, however it was stated that the proposed A6 Toome by-pass would ease the weight of traffic on that road significantly and that an exceedence would not be likely. The 2005 report confirmed that the by-pass takes the bulk of traffic away from it's original route thus reducing the impact of traffic on receptors close to the monitoring location. Results for site 6 showed a significant lowering of the annual average concentration in 2004 as opposed to the previous results. The new route runs through an area of open land in which there are no nearby receptors at present. Air quality objectives for SO_2 and PM_{10} continued to be met.

An 'Air Quality Update and Screening Assessment' report was submitted in April 2006. This report concluded that there was no necessity to carry out a Detailed Assessment in respect of NO_2, SO_2 or PM_{10}.

A "Progress Report on Air Quality Management" was submitted in April 2007. A review and assessment of pollutants showed the air quality objectives for NO_2, SO_2 and PM_{10} continued to be met throughout the district of Magherafelt.

A "Local Air Quality Management Grant Evaluation Form" was submitted in April 2008. Results for site 1 showed a clear exceedence for NO_2 and therefore this department were advised to undertake a Detailed Assessment.

A "Progress Report on Air Quality Management" was submitted in August 2008. Due to the exceedence to the NO_2 standard set for site 1, it was the intention of this department to provide an additional tube in the vicinity of the nearest residential property for comparison purposes.

A "Local Air Quality Management Grant Evaluation Form" was submitted in April 2009. Results for previous years showed a clear exceedence at site 1 for NO_2 and so an additional tube (site 8) was provided in the vicinity of the nearest residential property for comparison purposes (from 4th September 2008). Results to date show that levels of this pollutant meet with standards set. Monitoring will therefore cease at site 1 as properties in the vicinity of this tube are now commercial or available for commercial use.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Not applicable to Magherafelt District Council.

2.1.2 Non-Automatic Monitoring

Table 2.1 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location ?
Site 1	Main route through town	X 8958 Y 9048	NO2	No	No	1m	No
Site 2	Main route through town located between 2 roundabouts	X 8977 Y 9073	NO2	No	Yes (1m)	1m	Yes
Site 3	Adjacent staggered junction at most frequently used part of town	X 8531 Y 0043	NO2	No	Yes (1m)	1m	Yes
Site 4	Off main road leading to residential cul-de-sac	X 8989 Y 9078	NO2	No	Yes (10m)	20m	No
Site 5	Roadside location	X 9251 Y 9318	NO2	No	Yes (0m)	1m	Yes
Site 6	Area formerly adjacent to main arterial route	X 9887 Y 9085	NO2	No	Yes (25m)	1m	Yes
Site 7	Moderately used route into town centre	X 8982 Y 9069	NO2	No	Yes (15m)	1.5m	Yes
Site 8	Nearest residential property in vicinity of site 1	X 8960 Y 9046	NO2	No	Yes (0m)	10m	Yes

QA:QC data can be found in Appendix 1.

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Not applicable to Magherafelt District Council.

Diffusion Tube Monitoring Data

Table 2.2a Results of Nitrogen Dioxide Diffusion Tubes 2008

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations 2008 ($\mu g/m^3$) Adjusted for bias
1	Adjacent 36 Queen Street, Magherafelt	No	100	**43 ***
2	Adjacent 22 Church Street, Magherafelt	No	100	**54 ***
3	Adjacent 50 Main Street, Maghera	No	100	33
4	Wesleyan Mews, Magherafelt	No	100	20
5	Adjacent 15 Boyne Row, Castledawson	No	100	24
6	Adjacent 2 Bannside, Toomebridge	No	100	21
7	Adjacent 27 King Street, Magherafelt	No	100	25
8	42 Queen Street, Magherafelt	No	33	21

***** Indicates exceedence identified

Analysis of the diffusion tubes was carried out by Gradko Environmental. Monthly data for 2008 can be found in Appendix 2. Results for sites 1 - 7 are calculated based on 12 months data and the national database bias adjustment factor of 0.92 for Gradko Environmental. Site 8 is based on 4 months data and the local study (Belfast) bias adjustment factor of 0.79.

Table 2.2b Results of Nitrogen Dioxide Diffusion Tubes 2003 - 2007

Site ID	Location	Within AQMA?	Annual mean concentrations ($\mu g/m^3$) Adjusted for bias				
			2003	2004	2005	2006	2007
1	Adjacent 36 Queen Street, Magherafelt	No	30	36	23	33	47
2	Adjacent 22 Church Street, Magherafelt	No	36	37	29	35	37
3	Adjacent 50 Main Street, Maghera	No	32	30	34	33	38
4	Wesleyan Mews, Magherafelt	No	17	15	15	17	18
5	Adjacent 15 Boyne Row, Castledawson	No	20	16	16	17	20
6	Adjacent 2 Bannside, Toomebridge	No	25	18	15	14	20
7	Adjacent 27 King Street, Magherafelt	No	22	22	18	19	22

Analysis of the diffusion tubes was carried out by Lambeth Scientific Services Ltd. In line with the approach adopted by NETCEN in their report dated May 2002, when it was reported that there was a high variability in laboratory bias, both positive and negative, no bias correction has been made on 2003 – 2006 data.

Results for 2007 with the exception of site 6 are calculated based on the national databases bias adjustment factor of 1.056 for Lambeth Scentific Services Ltd. The result for site 6 is based on 7 months data and on the local study (Belfast) bias adjustment factor of 1.00.

2.2.2 PM_{10}

Not applicable to Magherafelt District Council, see section 1.4 of this report.

2.2.3 Sulphur Dioxide

Not applicable to Magherafelt District Council, see section 1.4 of this report.

2.2.4 Benzene

Not applicable to Magherafelt District Council, see section 1.4 of this report.

2.2.5 Other pollutants monitored

Not applicable to Magherafelt District Council, see section 1.4 of this report.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Magherafelt District Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

Magherafelt District Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

Magherafelt District Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.4 Junctions and busy roads

Magherafelt District Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

Magherafelt District Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

Magherafelt District Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Magherafelt District Council confirms that there are no relevant bus stations in the District.

4 Other Transport Sources

4.1 Airports

Magherafelt District Council confirms that there are no airports in the District.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Magherafelt District Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Magherafelt District Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

Magherafelt District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Magherafelt District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

Magherafelt District Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Magherafelt District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

Magherafelt District Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

Magherafelt District Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Magherafelt District Council confirms that there are no biomass combustion plant in the District.

6.2 Biomass Combustion – Combined Impacts

Magherafelt District Council confirms that there are no biomass combustion plant in the District.

6.3 Domestic Solid-Fuel Burning

Magherafelt District Council confirms that there are no areas of significant domestic fuel use in the District.

7 Fugitive or Uncontrolled Sources…

Magherafelt District Council confirms that there are no potential sources of fugitive particulate matter emissions in the District which are not being adequately controlled.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

At present no Air Quality Management Areas exist in the District of Magherafelt.

Nitrogen dioxide results for site 1 have shown a clear exceedence and so the area concerned has been re-assessed. As a result this department provided an additional tube (site 8), from 4th September 2008, in the vicinity of the nearest residential property for comparison purposes. Results to date show that levels of this pollutant meet with standards set. Monitoring will therefore cease at site 1 as properties in the vicinity of this tube are now commercial or available for commercial use.

Based on nitrogen dioxide monitoring data for 2008, it is evident that concentrations measured at site 2 are now exceeding the standard set. It is therefore the intention of this department to progress to a Detailed Assessment for this site.

8.2 Conclusions from Assessment of Sources

At present no Air Quality Management Areas exist in the District of Magherafelt. The assessment of all sources, as detailed in sections 3 - 7 of this report in conjunction with the Update and Screening Assessment of 2006, has not identified any potential exceedences to air quality objectives in the District of Magherafelt.

8.3 Proposed Actions

Based on monitoring data for 2008, it is evident that nitrogen dioxide concentrations measured at site 2 are now exceeding the standard set. It is therefore the intention of this department to progress to a Detailed Assessment for this site.

A Progress Report will be submitted by this department in 2010.

9 References

i. The Environment (Northern Ireland) Order 2002

ii. Air Quality Regulations (Northern Ireland) 2003

iii. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000

iv. DEFRA Local Air Quality Management Technical Guidance LAQM.TG(09)

v. Magherafelt District Council 1st Stage Review and Assessment of Air Quality 2001

vi. Magherafelt District Council 2nd Stage Review and Assessment of Air Quality 2002

vii. Magherafelt District Council Progress Report on Air Quality Management 2005

viii. Magherafelt District Council Air Quality Update and Screening Assessment 2006

ix. Magherafelt District Council Progress Report on Air Quality Management 2007

x. Magherafelt District Council Local Air Quality Management Grant Evaluation Form 2008

xi. Magherafelt District Council Progress Report on Air Quality Management 2008

xii. Magherafelt District Council Local Air Quality Management Grant Evaluation Form 2009

Appendices

Appendix A: QA/QC Data

Appendix B: Nitrogen dioxide diffusion tube monthly data for 2008

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Lambeth Scientific Services Ltd., Arlington Lodge, 26 Wanless Road, London, SE24 0HW supplied and analysed NO_2 diffusion tubes up until and including December 2007. Results for 2007 with the exception of site 6 are calculated based on the national database bias adjustment factor of 1.056 for Lambeth Scentific Services Ltd. The result for site 6 is based on 7 months data and on the local study (Belfast) bias adjustment factor of 1.00. Bias adjustment factors were obtained from the Air Quality Review and Assessment website.

NO_2 diffusion tubes for 2008 were supplied and analysed by Gradko Environmental, St. Martins House, 77 Wales Street, Winchester, Hampshire, SO23 0RH. The preparation method used was 20% Triethanolamine / Deionised Water. Results for sites 1 - 7 are calculated based on 12 months data and the national database bias adjustment factor of 0.92 for Gradko Environmental. Site 8 is based on 4 months data and on the local study (Belfast) bias adjustment factor of 0.79. Bias adjustment factors were obtained from the Air Quality Review and Assessment website.

Factor from Local Co-location Studies (if available)

Not applicable to Magherafelt District Council.

Discussion of Choice of Factor to Use

Guidance on the most suitable bias adjustment factor to be applied was taken from Technical Guidance.

Results for 2007 with the exception of site 6 are calculated based on the national database bias adjustment factor of 1.056 for Lambeth Scentific Services Ltd. The result for site 6 is based on 7 months data and on the local study (Belfast) bias adjustment factor of 1.00. Bias adjustment factors were obtained from the Air Quality Review and Assessment website.

2008 results for sites 1 - 7 are calculated based on 12 months data and the national database bias adjustment factor of 0.92 for Gradko Environmental. Site 8 is based on 4 months data and on the local study (Belfast) bias adjustment factor of 0.79. Bias adjustment factors were obtained from the Air Quality Review and Assessment website.

PM Monitoring Adjustment

Not applicable to Magherafelt District Council, see section 1.4 of this report.

Short-term to Long-term Data adjustment

Short-term data obtained by Magherafelt District Council was not adjusted to long-term data.

Nitrogen dioxide results for site 1 in 2007 showed a clear exceedence to the standard set and so an additional tube (site 8) was provided in the vicinity of the nearest residential property for comparison purposes (from 4th September 2008). The result for site 8 is based on 4 months data (September – December) and the local study (Belfast) bias adjustment factor of 0.79. Results to date show that levels of this pollutant meet with standards set.

QA/QC of automatic monitoring

Not applicable to Magherafelt District Council.

QA/QC of diffusion tube monitoring

Gradko Environmental analytical laboratory is assessed annually by UKAS to establish conformance of the Laboratory Quality Procedures to the requirements of ISO/IEC 17025 Standard and have demonstrated a good performance in the WASP scheme for analysis of NO_2 diffusion tubes, operated by the Health and Safety Laboratory, 2007-2008.

Appendix 2: Nitrogen dioxide diffusion tube monthly data for 2008

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER	26561
BOOKING IN REFERENCE No	B 0942
CUSTOMER	MAGHERAFELT DISTRICT COUNCIL 50 Ballyronan Road Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED	01/02/08

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	02/01/08	30/01/08	672.00	55.12	28.71	2.75
2	02/01/08	30/01/08	672.00	62.45	32.52	3.11
3	02/01/08	30/01/08	672.00	43.17	22.49	2.15
4	02/01/08	30/01/08	672.00	31.11	16.20	1.55
5	02/01/08	30/01/08	672.00	36.08	18.79	1.80
6	02/01/08	30/01/08	672.00	24.43	12.72	1.22
7	02/01/08	30/01/08	672.00	38.84	20.23	1.94
Lab Blank			672.00	0.00	0.00	0.00

Comment: Results are blank subtracted

Overall M.O.U	3.53% +/-	**Limit of Detection**	0.003µgNO_2
Tube Preparation : 20% TEA / Water	Analysed on UVS 003 Cecil		
Analyst Signature		**Analyst Name**	E.Bancerz
Date of Analysis	05/02/08	**Date of Report**	06/02/08

Analysis carried out in accordance with documented in-house Laboratory Method GLM6

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd.
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Page 1 of 1

REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of this document
Signed.....
G. Stutchbury, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER 26971
BOOKING IN REFERENCE No B 1413
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 28/02/08

	Exposure Data					TOTAL
Tube Number	Date On	Date Off	Time (hr.)	µg/m^3 *	ppb *	µG NO_2
1	30/01/08	27/02/08	672.00	50.81	26.46	2.53
2	30/01/08	27/02/08	672.00	56.94	29.66	2.84
3	30/01/08	27/02/08	672.00	47.26	24.61	2.36
4	30/01/08	27/02/08	672.00	30.42	15.84	1.52
5	30/01/08	27/02/08	672.00	27.96	14.56	1.39
6	30/01/08	27/02/08	672.00	28.53	14.86	1.42
7	30/01/08	27/02/08	672.00	33.91	17.66	1.69
Lab Blank			672.00	0.00	0.00	0.00

Comment: Results are blank subtracted

Overall M.O.U	3.53% +/-	**Limit of Detection**	0.003µgNO_2
Tube Preparation : 20% TEA / Water	Analysed on UVS 003 Cecil		
Analyst Signature		**Analyst Name**	E.Bancerz
Date of Analysis	29/02/08	**Date of Report**	03/03/08

Analysis carried out in accordance with documented in-house Laboratory Method GLM6

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REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of this document
Signed.....
C. Stutchbury, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER 27534
BOOKING IN REFERENCE No B 2106
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 04/04/08

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	27/02/08	02/04/08	840.00	38.57	20.09	2.40
2	27/02/08	02/04/08	840.00	58.46	30.45	3.64
3	27/02/08	02/04/08	840.00	31.60	16.46	1.97
4	27/02/08	02/04/08	840.00	19.80	10.31	1.23
5	27/02/08	02/04/08	840.00	26.35	13.72	1.64
6	27/02/08	02/04/08	840.00	18.49	9.63	1.15
7	27/02/08	02/04/08	840.00	30.44	15.85	1.90
Lab Blank			840.00	0.00	0.00	0.00

Comment: Results are blank subtracted

Overall M.O.U 3.53% +/- **Limit of Detection** 0.003µgNO_2
Tube Preparation : 20% TEA / Water Analysed on UVS 003 Cecil
Analyst Signature **Analyst Name** E.Bancerz

Date of Analysis 08/04/08 **Date of Report** 09/04/08

Analysis carried out in accordance with documented in-house Laboratory Method GLM6

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd.
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REPORT OFFICIALLY CHECKED

Gradko International Ltd
This signature confirms the authenticity of this document
Signed.....
C. Stutchbury, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER 28060
BOOKING IN REFERENCE No B 2633
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 02/05/08

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	02/04/08	30/04/08	672	38.82	20.22	1.94
2	02/04/08	30/04/08	672	51.76	26.96	2.58
3	02/04/08	30/04/08	672	29.23	15.22	1.46
4	02/04/08	30/04/08	672	15.71	8.18	0.78
5	02/04/08	30/04/08	672	24.67	12.85	1.23
6	02/04/08	30/04/08	672	21.08	10.98	1.05
7	02/04/08	30/04/08	672	16.40	8.54	0.82
Lab Blank			672	0.00	0.00	0.00

Comment: Results are blank subtracted

Overall M.O.U 3.53% +/- **Limit of Detection** 0.003µgNO_2
Tube Preparation : 20% TEA / Water Analysed on UVS 003 Cecil
Analyst Signature **Analyst Name** E.Bancerz

Date of Analysis 09/05/08 **Date of Report** 09/05/08

Analysis carried out in accordance with documented in-house Laboratory Method GLM6

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd.
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Gradko International Ltd
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Signed.....
C. Stutchbury, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER 28614

BOOKING IN REFERENCE No B 3177

CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN

DATE SAMPLES RECEIVED 30/05/2008

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	30/04/2008	28/05/2008	672.00	68.10	35.54	3.40
2	30/04/2008	28/05/2008	672.00	66.40	34.65	3.31
3	30/04/2008	28/05/2008	672.00	30.04	15.68	1.50
4	30/04/2008	28/05/2008	672.00	21.58	11.26	1.08
5	30/04/2008	28/05/2008	672.00	19.73	10.30	0.98
6	30/04/2008	28/05/2008	672.00	25.35	13.23	1.26
7	30/04/2008	28/05/2008	672.00	24.65	12.86	1.23
Lab Blank			672.00	0.08	0.04	0.004

Comment: Results are blank subtracted

Overall M.O.U	5.98% +/-	**Limit of Detection**	0.006µgNO_2
Tube Preparation : 20% TEA / Water	Analysed on UVS04 Camspec M550		
Analyst Signature		**Analyst Name**	E.Bancerz
Date of Analysis	16/06/2008	**Date of Report**	16/06/2008

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd.
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G. Stutchbury, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V.SPECTROPHOTOMETRY

REPORT NUMBER 29059
BOOKING IN REFERENCE No B 4020
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 04/07/2008

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	28/05/2008	02/07/2008	840.00	43.12	22.51	2.69
2	28/05/2008	02/07/2008	840.00	64.16	33.48	4.00
3	28/05/2008	02/07/2008	840.00	38.13	19.90	2.38
4	28/05/2008	02/07/2008	840.00	17.01	8.88	1.06
5	28/05/2008	02/07/2008	840.00	24.85	12.97	1.55
6	28/05/2008	02/07/2008	840.00	21.47	11.20	1.34
7	28/05/2008	02/07/2008	840.00	26.74	13.96	1.67
Lab Blank			840.00	0.06	0.03	0.004

Comment: Results are blank subtracted

Overall M.O.U 5.98% +/- **Limit of Detection** 0.006µgNO_2
Tube Preparation : 20% TEA / Water Analysed on UVS04 Camspec M550
Analyst Signature **Analyst Name** E.Bancerz

Date of Analysis 14/07/2008 **Date of Report** 14/07/2008

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd.
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C. Stutchbury, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V. SPECTROPHOTOMETRY

REPORT NUMBER 29612
BOOKING IN REFERENCE No B 4624
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 01/08/2008

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	02/07/2008	30/07/2008	672.00	36.66	19.13	1.83
2	02/07/2008	30/07/2008	672.00	41.15	21.48	2.05
3	02/07/2008	30/07/2008	672.00	26.87	14.02	1.34
4	02/07/2008	30/07/2008	672.00	15.44	8.06	0.77
5	02/07/2008	30/07/2008	672.00	21.88	11.42	1.09
6	02/07/2008	30/07/2008	672.00	18.65	9.73	0.93
7	02/07/2008	30/07/2008	672.00	22.24	11.61	1.11
Lab Blank			672.00	0.06	0.03	0.003

Comment: Results are blank subtracted

Overall M.O.U 5.98% +/- **Limit of Detection** 0.006µgNO_2
Tube Preparation : 20% TEA / Water Analysed on UVS04 Camspec M550
Analyst Signature **Analyst Name** E.Bancerz

Date of Analysis 14/08/2008 **Date of Report** 14/08/2008

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

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Signed.....
G. Stutchbury, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

UKAS TESTING 2187

LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V. SPECTROPHOTOMETRY

REPORT NUMBER 30148
BOOKING IN REFERENCE No B 5408
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 08/09/2008

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	30/07/2008	04/09/2008	860.00	39.38	20.55	2.51
2	30/07/2008	04/09/2008	860.00	56.60	29.54	3.61
3	30/07/2008	04/09/2008	860.00	37.92	19.79	2.42
4	30/07/2008	04/09/2008	860.00	14.54	7.59	0.93
5	30/07/2008	04/09/2008	860.00	25.12	13.11	1.60
6	30/07/2008	04/09/2008	860.00	22.24	11.61	1.42
7	30/07/2008	04/09/2008	860.00	22.97	11.99	1.47
Lab Blank			860.00	0.06	0.03	0.004

Comment: Results are blank subtracted

Overall M.O.U	5.98% +/-	**Limit of Detection**	0.006µgNO_2
Tube Preparation : 20% TEA / Water	Analysed on UVS04 Camspec M550		
Analyst Signature		**Analyst Name**	E.Bancerz
Date of Analysis	17/09/2008	**Date of Report**	17/09/2008

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd.
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G. Stutchbury, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V. SPECTROPHOTOMETRY

REPORT NUMBER 30714
BOOKING IN REFERENCE No B 5939
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 03/10/2008

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	04/09/2008	01/10/2008	652.00	45.39	23.69	2.20
2	04/09/2008	01/10/2008	652.00	50.89	26.56	2.46
3	04/09/2008	01/10/2008	652.00	21.29	11.11	1.03
4	04/09/2008	01/10/2008	652.00	17.86	9.32	0.86
5	04/09/2008	01/10/2008	652.00	15.79	8.24	0.76
6	04/09/2008	01/10/2008	652.00	14.76	7.70	0.71
7	04/09/2008	01/10/2008	652.00	21.68	11.32	1.05
8	04/09/2008	01/10/2008	652.00	17.55	9.16	0.85
Lab Blank			652.00	0.08	0.04	0.004

Comment: Results are blank subtracted

Overall M.O.U.	5.98% +/-	**Limit of Detection**	0.006µgNO_2
Tube Preparation : 20% TEA / Water	Analysed on UVS04 Camspec M550		
Analyst Signature		**Analyst Name**	K. Bakala
Date of Analysis	15/10/2008	**Date of Report**	16/10/2008

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd.
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gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V. SPECTROPHOTOMETRY

REPORT NUMBER 31143
BOOKING IN REFERENCE No B 6515
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 31/10/2008

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	01/10/2008	30/10/2008	692.00	33.53	17.50	1.72
2	01/10/2008	30/10/2008	692.00	55.38	28.91	2.84
3	01/10/2008	30/10/2008	692.00	38.31	19.99	1.97
4	01/10/2008	30/10/2008	692.00	17.31	9.04	0.89
5	01/10/2008	30/10/2008	692.00	25.41	13.26	1.31
6	01/10/2008	30/10/2008	692.00	24.19	12.62	1.24
7	01/10/2008	30/10/2008	692.00	24.52	12.80	1.26
8	01/10/2008	30/10/2008	692.00	18.79	9.81	0.97
Lab Blank			692.00	0.12	0.06	0.006

Comment: Results are blank subtracted

Overall M.O.U.	5.98% +/-	**Limit of Detection**	0.006µgNO_2
Tube Preparation : 20% TEA / Water	Analysed on UVS04 Camspec M550		
Analyst Signature		**Analyst Name**	K. Bakala
Date of Analysis	11/11/2008	**Date of Report**	11/11/2008

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

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G. Stutchbury, Laboratory Manager

gradko environmental
(A division of Gradko International Ltd.)
St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V. SPECTROPHOTOMETRY

REPORT NUMBER 31713
BOOKING IN REFERENCE No B 7221
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 05/12/2008

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	30/10/2008	03/12/2008	816.00	51.48	26.87	3.12
2	30/10/2008	03/12/2008	816.00	72.55	37.86	4.39
3	30/10/2008	03/12/2008	816.00	47.35	24.71	2.87
4	30/10/2008	03/12/2008	816.00	24.69	12.89	1.50
5	30/10/2008	03/12/2008	816.00	34.61	18.07	2.10
6	30/10/2008	03/12/2008	816.00	23.81	12.43	1.44
7	30/10/2008	03/12/2008	816.00	26.37	13.77	1.60
8	30/10/2008	03/12/2008	816.00	34.57	18.04	2.09
Lab Blank			816.00	0.00	0.00	0.000

Comment: Results are blank subtracted

Overall M.O.U.	5.98% +/-	**Limit of Detection**	0.006µgNO_2
Tube Preparation : 20% TEA / Water	Analysed on UVS04 Camspec M550		
Analyst Signature		**Analyst Name**	K. Bakala
Date of Analysis	12/12/2008	**Date of Report**	15/12/2008

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

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LABORATORY ANALYSIS REPORT

NITROGEN DIOXIDE IN DIFFUSION TUBES BY U.V. SPECTROPHOTOMETRY

REPORT NUMBER 32213
BOOKING IN REFERENCE No C 0181
CUSTOMER MAGHERAFELT DISTRICT COUNCIL
50 Ballyronan Road
Magherafelt, Co Londonderry BT45 6EN
DATE SAMPLES RECEIVED 09/01/2009

	Exposure Data					TOTAL
Tube Number	**Date On**	**Date Off**	**Time (hr.)**	**µg/m³ ***	**ppb ***	**µG NO_2**
1	03/12/2008	07/01/2009	840.00	64.06	33.43	3.99
2	03/12/2008	07/01/2009	840.00	72.56	37.87	4.52
3	03/12/2008	07/01/2009	840.00	45.66	23.83	2.85
4	03/12/2008	07/01/2009	840.00	36.26	18.92	2.26
5	03/12/2008	07/01/2009	840.00	36.61	19.11	2.28
6	03/12/2008	07/01/2009	840.00	31.68	16.54	1.98
7	03/12/2008	07/01/2009	840.00	39.35	20.54	2.45
8	03/12/2008	07/01/2009	840.00	33.82	17.65	2.11
Lab Blank			840.00	0.06	0.03	0.004

Comment: Results are blank subtracted

Overall M.O.U.	5.98% +/-	**Limit of Detection**	0.006µgNO_2
Tube Preparation : 20% TEA / Water	Analysed on UVS04 Camspec M550		
Analyst Signature		**Analyst Name**	K. Bakala
Date of Analysis	23/01/2009	**Date of Report**	23/01/2009

Analysis carried out in accordance with documented in-house Laboratory Method GLM7

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