2009 Air Quality Updating and Screening Assessment for Ballymoney Borough Council

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

July 2009

Local Authority Officer	Lynne O'Brien

Department	Directorate of Borough Services
Address	Riada House 14 Charles Street Ballymoney Co. Antrim BT53 6DZ
Telephone	028 2766 0257
e-mail	lynne.obrien@ballymoney.gov.uk

Report Reference number	
Date	July 2009

Executive Summary

The Environment (Northern Ireland) Order 2002 and subsequent Regulations introduced the Local Air Quality Management (LAQM) system which requires District Councils to undertake regular review and assessment of air quality, with respect to the standards and objectives set in the Air Quality Strategy. In areas where an air quality objective is predicted not to be met by the required date, District Councils are required to establish Air Quality Management Areas (AQMA's) and implement Action Plans to improve air quality. This document forms the Updating and Screening Assessment for Ballymoney Borough Council. In writing this report the Council has had regard to the Government's published guidance confirmed in Local Air Quality Management Technical Guidance LAQM.TG(09).

This report provides the latest PM_{10} monitoring results from the station located in the Glebeside estate, and the Nitrogen Dioxide diffusion tube monitoring carried out across Ballymoney town. All of the monitoring results indicate that the Air Quality Objectives for these pollutants continue to be met and that exceedances are not anticipated. A modelling report with regard to PM10 has recommended that Ballymoney Borough Council revoke the Air Quality Management Area.

Table of contents

Appendices

Appendix 1	PM_{10} 2008 data monitoring report
Appendix 2	BAM site audit reports August 2008 & February 2009
Appendix 3	Bias adjustment factor spreadsheet v05/09
Appendix 4	QA/QC information for NO2 diffusion tubes
Appendix 5	NO_2 monthly mean values 2008
Appendix 6	AEA Air quality review and assessment report on impact of NIHE heating conversion scheme on PM_{10} levels within the AQMA

1 Introduction

1.1 Description of Local Authority Area

Ballymoney Borough covers 161 sq miles (41,700 hectares) and is predominantly rural in character. The town of Ballymoney is its administrative, commercial and educational centre, and there are a number of small villages in the rural hinterland. The Borough lies within the Antrim Coast and Glens Area of Outstanding Natural Beauty and also the Lower Bann valley, which forms part of the Borough's western boundary. The area's population has grown from 26,894 in 2001 to 29,225 741in 2007 with one-third of the population of the borough living near or within the town of Ballymoney and the number of homes in the borough is currently 11,743.

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 micrograms 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

Table 1: Summary of previous review and assessments undertaken by Ballymoney Borough Council

Round	Stage	Recommendations or other actions	Report
Round 1	Stage 1 (2000)	A stage 2 assessment was carried out.	Carried out by Ballymoney BC. HES Committee minute 246.2.5.6 29th August 2000.
	Stage 2 (2002)	A stage 3 assessment was not required for NO_2, SO_2 or PM_{10} for emissions from vehicular or industrial sources.	Hobson (2002)
	Stage 3 – Domestic Fuel Combustion (2004)	No further assessment is needed in the Glebeside area. Monitoring data was from Carrickfergus.	Grice (2004)
	Stage 2/3 Assessment	It is not necessary to declare an Air Quality Management Area (AQMA) with respect to either PM_{10} particulates or sulphur dioxide, PM_{10} data capture should continue for a further 12-month period.	Ballymoney BC (2004)

	Reverification report (2005)	Based on the measured exceedance of the daily standard Ballymoney BC were recommended to proceed to declare an AQMA for PM_{10}.	Haig (2005)
	Progress Report (2005)	Recommends that the Council declare an AQMA in respect of PM_{10} and submit a draft action plan to relevant authorities.	Ballymoney BC (2005)
	Stage 4 (2006) – Domestic Fuel Combustion.	PM_{10} concentrations in 2004 were corrected (by dividing through by a factor of 1.2). Exceedance of PM_{10} concentrations. AQMA declaration was recommended to continue.	Targa (2006)
Round 2	Updating and Screening Assessment (2006)	Indicates that the objective will not be met for the daily mean PM_{10} objective within the AQMA but will be achieved elsewhere within the Borough.	Ballymoney BC (2006)
	Progress Report (2007)	To progress the air quality action plan and continue further monitoring of particulate matter.	Ballymoney BC (2007)
	Progress Report (2008)	To monitor local levels of PM_{10} to determine the improvements made by the NIHE solid fuel to gas conversion scheme.	Ballymoney BC (2008)

	Impact of heating conversion scheme on AQMA report (2009)	PM_{10} objectives have been met and are not likely to be breached in the future. Recommends revocation of AQMA	AEA (2009)

As a result of the first round of review and assessment of air quality required to identify areas unlikely to meet national air quality objectives, an Air Quality Management Area (AQMA) was declared in Ballymoney Borough Council (Ballymoney Town AQMA) in September 2005. The AQMA was defined for an area in the north west of Ballymoney, bounded to the east by the railway line, to the north by the A26 and to the west by the B66. Figure 1 shows the extent of the AQMA- indicated by the yellow marking on the A26, B55 and along the railway line.

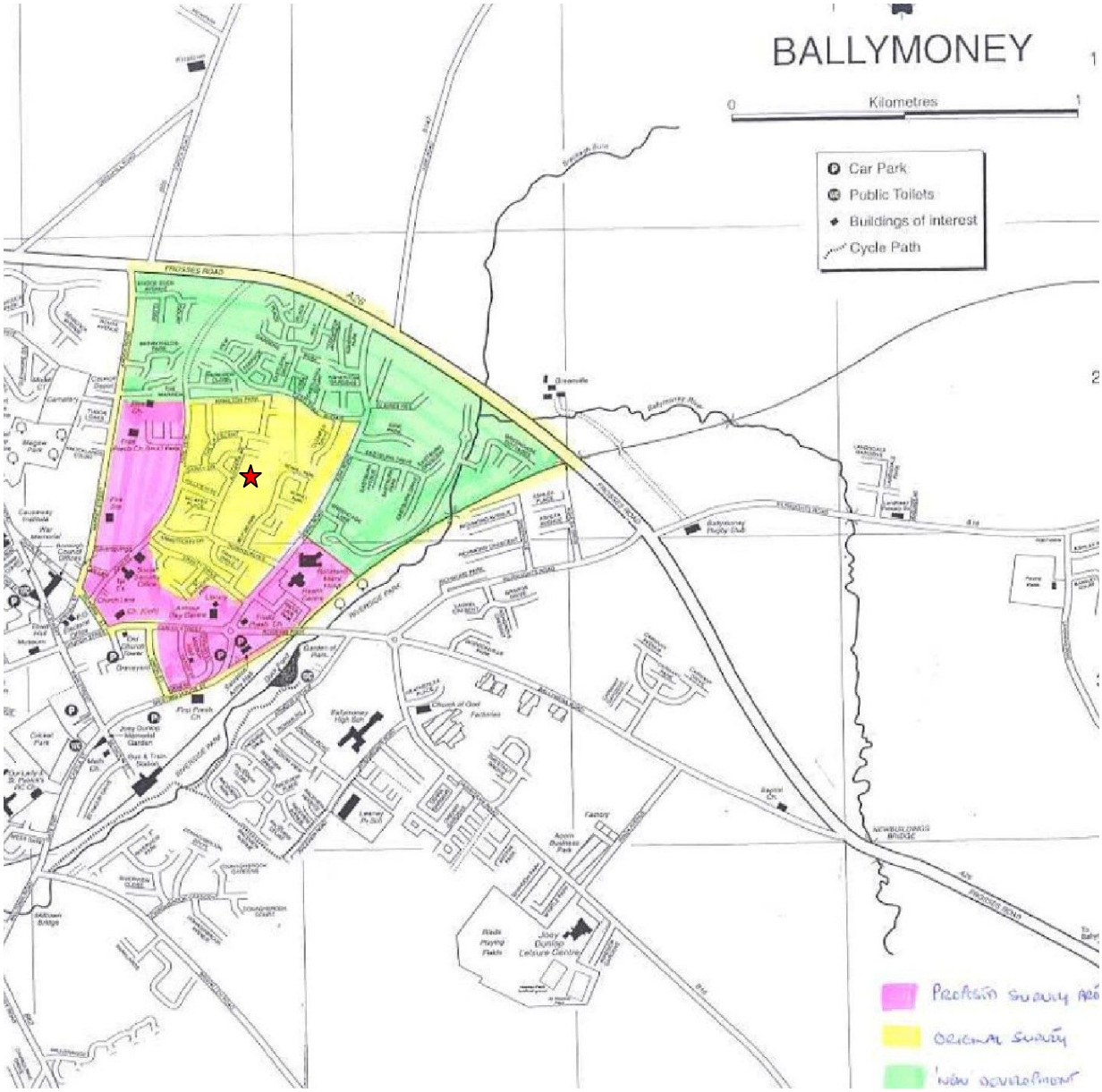


Figure 1: Location of Air Quality Management Area within Ballymoney Borough Council (★ indicates location of PM10 monitor)

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

A Met One BAM 1020 analyser located within the Glebeside residential development in Ballymoney carries out continuous monitoring of PM_{10}. Monitoring commenced at the station in December 2003. The analyser is housed within a secure air-conditioned unit.

QA/QC and data management was carried out by NPL from December 2003 – December 2004 and is currently carried out by NETCEN who validate and ratify the raw data and provide the Council with results on a twice-yearly basis (see Appendix 1 for the 2008 report) as well as conducting twice yearly site audits (Appendix 2). Data reports are also provided on a daily basis via e-mail, however this data is not validated. For a mapped location of the monitor see Figure 1.

Table 2.1 Details of 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 ?
Glebeside	Urban background	-	PM_{10}	Y	Y (10m)	N/A	Y

2.1.2 Non-Automatic Monitoring

Ballymoney Borough Council carry out monitoring of NO_2 by diffusion tubes at eight sites within the Borough. Four of the sites are included within the UK NO_2 network.

Throughout 2007 the diffusion tubes were analysed by Lambeth Scientific Services Limited (LSSL). However, following guidance received by the Department of the Environment, diffusion tubes have been analysed by Gradko from February 2008. Difficulties with the accuracy of the data from the diffusion tube supplier necessitated a change in supplier contracts and therefore the 2007 data may not be entirely reliable.

Diffusion tubes frequently exhibit bias (over- or under-read) relative to the chemiluminescence analyser (the reference technique for NO_2), and the Guidance states that it is necessary to correct for any such bias, when using diffusion tube results for review and assessment purposes. As Ballymoney Borough Council does not have any permanent automatic NO_2 monitoring sites, they are not able to carry out the necessary intercomparison locally. Instead, information was obtained from a summary spreadsheet of Local Authority co-location studies prepared by Air Quality Consultants and available via the Air Quality Review and Assessment website, at http://www.uwe.ac.uk/aqm/review. A bias adjustment factor of 1.06 was taken from the spreadsheet of bias adjustment factors v.05/09 (Appendix 3).

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	Address	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 ?
1N	Kerbside	19 Linenhall St	NO_2	N	N	1m	Y
2N	Kerbside	8 Ballybogey Road	NO_2	N	Y (10m)	1m	Y
3N	Urban Background	Opp 16 Armour Ave	NO_2	N	Y (20m)	N/A	Y
4N	Urban Background	Semicock Avenue	NO_2	N	Y (5m)	N/A	Y
6N	Kerbside	31 Charles Street	NO_2	N	Y (10m)	1m	Y
7N	Kerbside	Opp 51 Queen Street	NO_2	Y	Y (15m)	1m	Y
8N	Kerbside	Meetinghouse Street	NO_2	N	Y (15m)	1m	Y
9N	Kerbside	Castle Street	NO_2	N	Y (10m)	1m	Y

Ballymoney Borough Council diffusion tubes have been analysed by Gradko since February 2008. Appendix 4 gives details of preparation method and a statement confirming that the laboratory follows the procedures set out in the Harmonisation Practical Guidance.

2.2 Comparison of Monitoring Results with AQ Objectives

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 μgm^{-3}	9	9
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 μgm^{-3}	0	-

The table below shows the annual mean and number of exceedences of the 50 μgm^{-3} concentration threshold. Annual mean concentrations have decreased steadily since 2004. The number of exceedances of the daily 50 μgm^{-3} concentration threshold has also decreased significantly

Year	Annual mean μgm^{-3}	Number of exceedence of daily 50 μgm^{-3} value	Data capture (%)
2004	30.3	28	69
2005	27.0	25	95
2006	25.3	13	90
2007	19.7	4	90
2008	**17.3**	**9**	**96**

2.2.1 Nitrogen Dioxide

Ballymoney Borough Council has not measured an annual mean concentration at any site greater than 40 µg/m^3

Automatic Monitoring Data

Ballymoney Borough Council does not have any automatic monitoring sites for Nitrogen Dioxide.

Diffusion Tube Monitoring Data

Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations 2008 (µg/m^3) Adjusted for bias
1N	19 Linenhall St, Ballymoney	N	>90%	29.11
2N	8 Ballybogey Road, Ballymoney	N	>90%	18.97
3N	Opposite 16 Armour Ave, Ballymoney	N	>90%	10.00
4N	2-4 Semicock Ave, Ballymoney	N	>90%	10.89
6N	31 Charles Street, Ballymoney	N	>90%	21.42
7N	Opposite 51 Queen Street, Ballymoney	Y	>90%	25.81
8N	Opposite 39 Castle Street, Ballymoney	N	>90%	30.40
9N	16 Meetinghouse Str Ballymoney	N	>90%	20.44

Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Annual mean concentrations ($\mu g/m^3$) Adjusted for bias		
			2006 *	2007 *	2008
1N	19 Linenhall St, Ballymoney	N	24	26	29
2N	8 Ballybogey Road, Ballymoney	N	15	17	19
3N	Opposite 16 Armour Ave, Ballymoney	N	9	10	10
4N	2-4 Semicock Ave, Ballymoney	N	9	11	11
6N	31 Charles Street, Ballymoney	N	16	21	21
7N	Opposite 51 Queen Street, Ballymoney	Y	15	24	26
8N	Opposite 39 Castle Street, Ballymoney	N	23	26	30
9N	16 Meetinghouse Str Ballymoney	N	12	18	20

Although in increase in Nitrogen Dioxide levels has been noted, the annual means remain well below the objective limit.

2.2.2 PM_{10}

Table 2.5a Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations ($\mu g/m^3$)		
				2006	2007	2008
1	Alexandra Avenue	Y	96	25.3	19.7	17.3

Table 2.5b Results of PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of hourly mean (50 μg/m^3) *If data capture < 90%, include the 90th %ile of hourly means in brackets.*		
				2006*	2007*	2008
1	Alexandra Avenue	Y	96	13	4	9

2.2.3 Sulphur Dioxide

Ballymoney Borough Council does not monitor Sulphur Dioxide

2.2.4 Benzene

Ballymoney Borough Council does not monitor Sulphur Dioxide

2.2.5 Other pollutants monitored

Ballymoney Borough Council does not monitor any other pollutants.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Ballymoney Borough 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

Ballymoney Borough 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.

Ballymoney Borough Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

Ballymoney Borough 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

Ballymoney Borough Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

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

3.7 Bus and Coach Stations

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

4 Other Transport Sources

4.1 Airports

Ballymoney Borough Council confirms that there are no airports in the District.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Ballymoney Borough 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

Ballymoney Borough 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)

Ballymoney Borough 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

Ballymoney Borough 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

Ballymoney Borough 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

Ballymoney Borough 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

Ballymoney Borough Council confirms that there are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

Ballymoney Borough Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

Ballymoney Borough Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Ballymoney Borough Council confirms that there are no biomass combustion plants in the District.

6.2 Biomass Combustion – Combined Impacts

Ballymoney Borough Council confirms that there are no biomass combustion plants in the District, including the impact of domestic biomass combustion.

6.3 Domestic Solid-Fuel Burning

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

7 Fugitive or Uncontrolled Sources

Ballymoney Borough Council confirms that there are no potential sources of fugitive particulate matter emissions in the District.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Ballymoney Borough Council commissioned an air quality review and assessment in November 2009 to determine what effect a major domestic heating conversion carried out by the Northern Ireland Housing Executive (NIHE) within the AQMA may have had on PM_{10} concentrations. A full copy of this report can be found in Appendix 6 to this document.

It was recommended that Ballymoney Borough Council should revoke the Ballymoney Town Air Quality Management Area for the following reasons:

1. The measurement data indicates that the annual average PM_{10} concentration in 2007 and 2008 was less than half of the annual average objective (40 μgm^{-3}). Also the number of exceedences of the 50 μgm^{-3} daily objective was considerably less than the 35 that would cause exceedance of the short-term objective (4 exceedances in 2007 and 9 exceedances in 2008).

2. The air quality modelling showed that the highest concentrations are predicted for areas north of the sampling site (around Hamilton Park/The Crescent) and south of the sampling site (around Union Street/Henry Street). These concentrations are just marginally higher than what was measured at the sampling site and are approximately half the annual average objective concentration of 40 μgm^{-3}. The modelled 90.4 percentile of daily mean concentrations was much less than the daily air quality objective for PM_{10}. Hence no exceedance of the annual or daily air quality objectives are predicted in Ballymoney Borough Council.

8.2 Conclusions from Assessment of Sources

On examining the likely impacts of local developments: road transport, other transport, industrial installations, commercial/domestic, fugitive emissions, residential and commercial etc. it can be concluded that no potential exceedances have been identified outside the existing AQMA.

8.3 Proposed Actions

Ballymoney Borough Council intends to revoke the AQMA and submit a progress report in 2010. Ballymoney Borough Council do not intend to continue to monitor PM10 levels using the BAM 1020 monitor after 31st December 2009 when the current maintenance and QA/QC contracts expire. However, nitrogen dioxide levels will continue to be monitored through the use of diffusion tubes.

9 References

AEA (2009) Impact of heating conversion scheme on AQMA. February 2009.

Ballymoney Borough Council (2004) Stage 2/3 Air Quality Review and Assessment Report. June 2004.

Ballymoney Borough Council (2005) Air Quality Review And Assessment Progress Report. April 2005.

Ballymoney Borough Council (2006) Air Quality Updating and Screening Assessment. April 2006.

Ballymoney Borough Council (2007) Air Quality Review And Assessment Progress Report. August 2007.

Ballymoney Borough Council (2008) Air Quality Review And Assessment Progress Report. August 2008.

Ballymoney Borough Council (2008). Fuel use data in NIHE dwellings in Glebeside and Trinity Drive areas. Information sent by Lynne O'Brien to Marios Valiantis 22nd December 2008. BCC reference BS/5133/08(PC).

Haig (2005). Letter report to Lynne McCullough, Ballymoney Borough Council, 21st March 2005,

Hobson (2002) Air Quality Review and Assessment - Stage 2, A report produced by AEA for Ballymoney Borough Council. Report number AEAT/R/ENV/1017

Grice (2004) Air Quality Review and Assessment - Stage 3. A report produced for Ballymoney Borough Council. Report number AEAT/ENV/R/1648

Targa (2006). Air Quality Review and Assessment. Stage 4 – Domestic Fuel Combustion. A report produced for Ballymoney Borough Council. Report number AEAT/ENV/R/2162

Appendix 1

Produced by AEA on behalf of Ballymoney Borough Council

BALLYMONEY
01 January to 31 December 2008

These data have been fully ratified by AEA

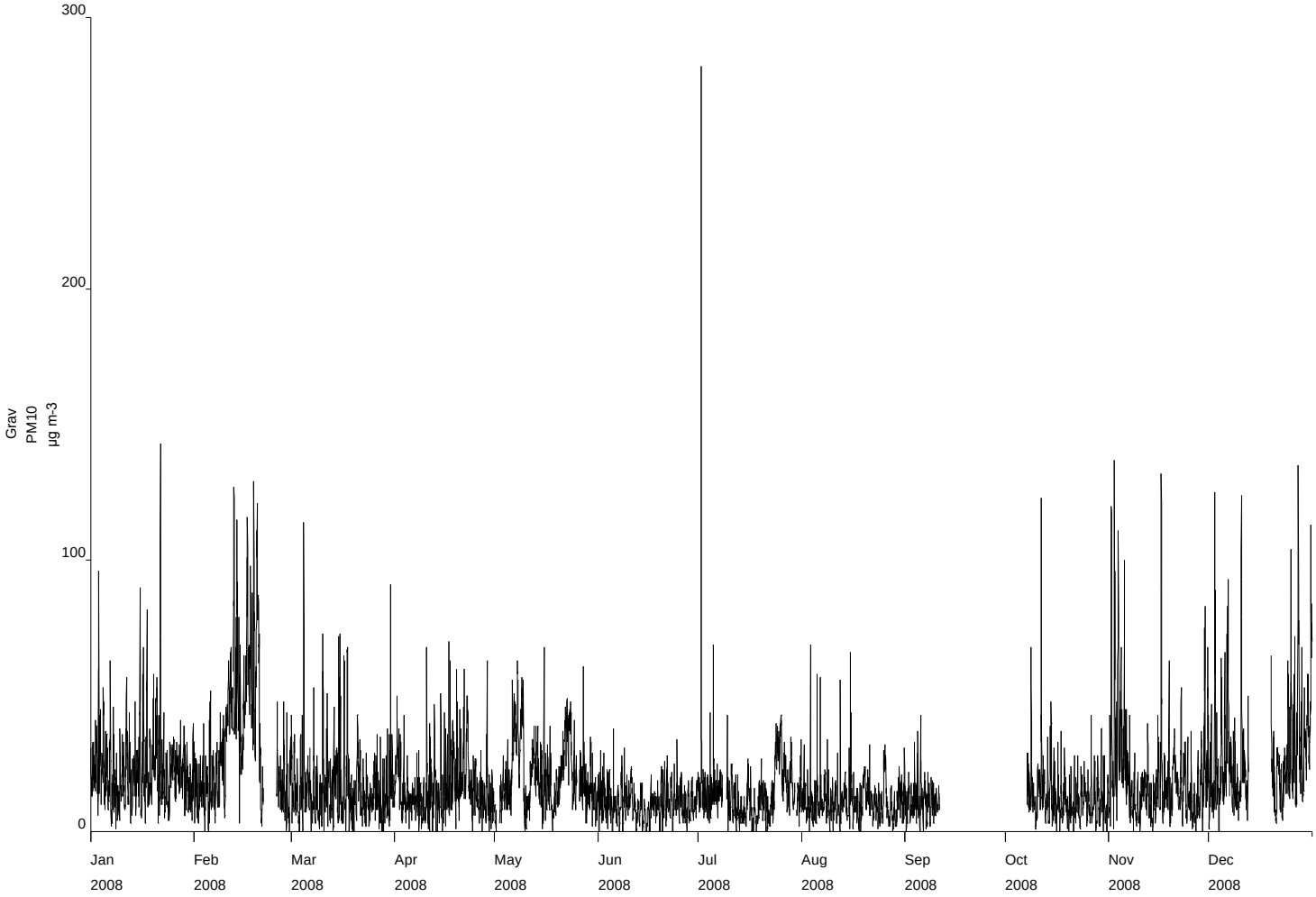
POLLUTANT	PM_{10}*+
Number Very High	0
Number High	0
Number Moderate	60
Number Low	7678
Maximum 15-minute mean	282 μgm^{-3}
Maximum hourly mean	282 μgm^{-3}
Maximum running 8-hour mean	98 μgm^{-3}
Maximum running 24-hour mean	82 μgm^{-3}
Maximum daily mean	66 μgm^{-3}
90th percentile of daily means	31 μgm^{-3}
Average	18 μgm^{-3}
Data capture	88.9 %

+ PM_{10} instruments: BAM using a gravimetric factor of 0.83333 for Indicative Gravimetric Equivalence
All mass units are at 20'C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 μgm^{-3}	9	9
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 μgm^{-3}	0	-

Produced by AEA on behalf of Ballymoney Borough Council

Ballymoney
Hourly Mean Data for 01 January to 31 December 2008



Appendix 2

From: Colin Rae [Colin.Rae@aeat.co.uk]
Sent: 15 August 2008 11:11
To: O'Brien Lynne
Cc: David Madle
Subject: Results of the Ballymoney AQMS audit

Hello Lynne,
Here is the result of the audit I carried out on the AQMS at Ballymoney earlier in the week.

Ballymoney BAM - All ok

If you have any further questions regrading the audit please don't hesitate in getting in contact with me.

Regards
Colin Rae

AEA Energy & Environment
Glengarnock Technology Centre
Caledonian Road
Lochshore Industrial Estate
Glengarnock
North Ayrshire
KA14 3DD
Telephone: +44 (0)870 190 6809
Facsimile: +44 (0)870 190 5151
e-mail Colin.Rae@aeat.co.uk

From: Edgar Bryan [bryan.edgar@ballymoney.gov.uk]
Sent: 20 February 2009 11:46
To: O'Brien Lynne
Subject: FW: AQMS Audit Results
Lynne,

PM10 monitoring results.

Regards

Bryan

-----Original Message-----
From: Stephen Stratton [mailto:Stephen.Stratton@aeat.co.uk]
Sent: 20 February 2009 11:08
To: Edgar Bryan
Subject: AQMS Audit Results

Hello Brian,

Please find a summary of the AQMS audit results below:

Ballymoney

PM10: All OK

Please do not hesitate to contact me if you have any questions.

Kind regards,

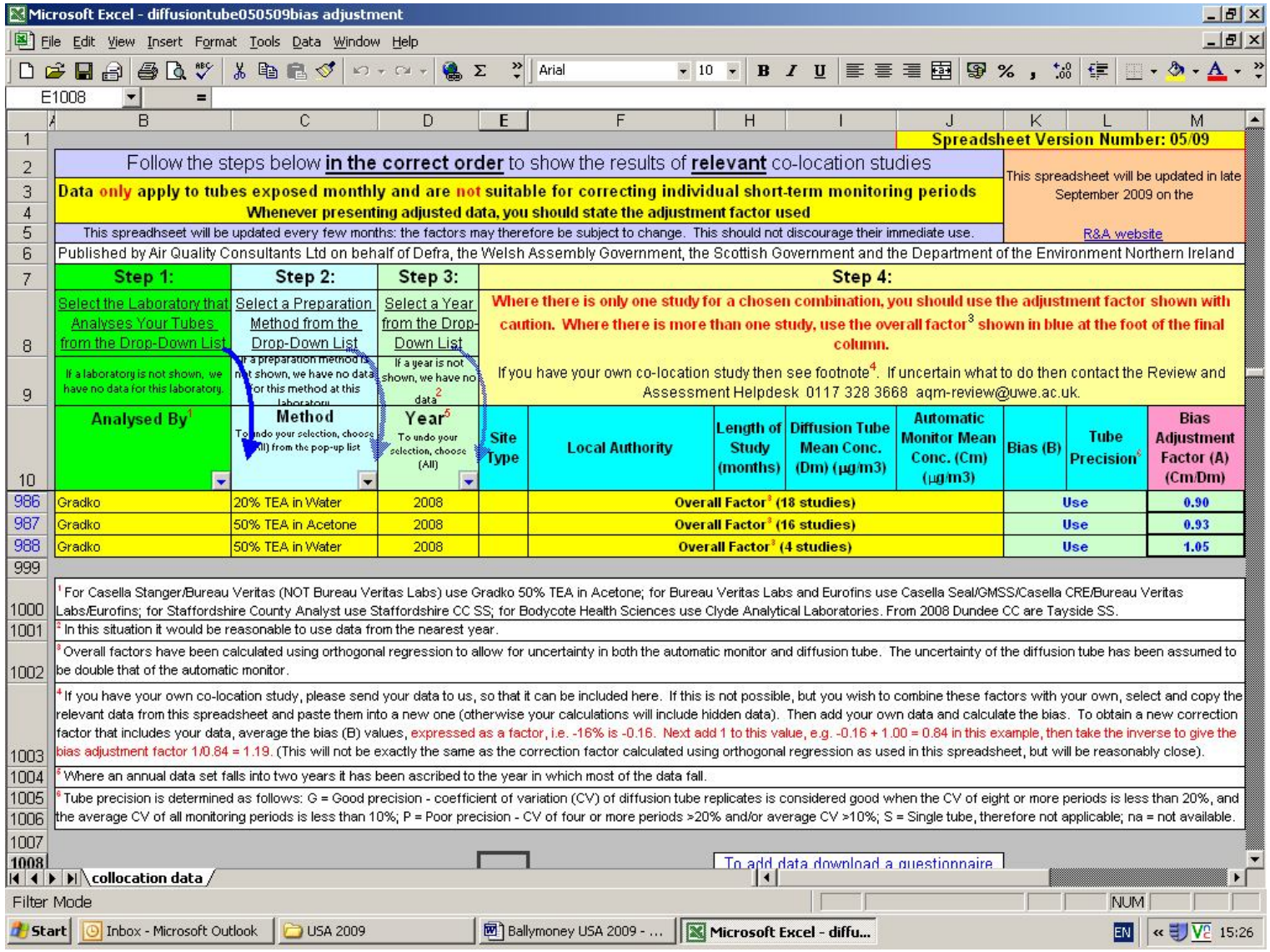
Stephen

_____

Stephen Stratton
Ambient Air Quality Monitoring
AEA Energy & Environment
Glengarnock Technology Centre
Caledonian Road
Lochshore Business Park
Glengarnock
Ayrshire
KA14 3DD

Tel: 0870 190 5203
Mob: 07968 707 276
Fax: 0870 190 5151

Appendix 3



Microsoft Excel - diffusiontube050509bias adjustment

File Edit View Insert Format Tools Data Window Help

Arial 10

E1008 =

Spreadsheet Version Number: 05/09

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated in late September 2009 on the R&A website

Published by Air Quality Consultants Ltd on behalf of Defra, the Welsh Assembly Government, the Scottish Government and the Department of the Environment Northern Ireland

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List. If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List. If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List. If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Review and Assessment Helpdesk 0117 328 3668 aqm-review@uwe.ac.uk.

	Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m3)	Automatic Monitor Mean Conc. (Cm) (µg/m3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
986	Gradko	20% TEA in Water	2008		Overall Factor[3] (18 studies)				Use		0.90
987	Gradko	50% TEA in Acetone	2008		Overall Factor[3] (16 studies)				Use		0.93
988	Gradko	50% TEA in Water	2008		Overall Factor[3] (4 studies)				Use		1.05

[1] For Casella Stanger/Bureau Veritas (NOT Bureau Veritas Labs) use Gradko 50% TEA in Acetone; for Bureau Veritas Labs and Eurofins use Casella Seal/GMSS/Casella CRE/Bureau Veritas Labs/Eurofins; for Staffordshire County Analyst use Staffordshire CC SS; for Bodycote Health Sciences use Clyde Analytical Laboratories. From 2008 Dundee CC are Tayside SS.

[2] In this situation it would be reasonable to use data from the nearest year.

[3] Overall factors have been calculated using orthogonal regression to allow for uncertainty in both the automatic monitor and diffusion tube. The uncertainty of the diffusion tube has been assumed to be double that of the automatic monitor.

[4] If you have your own co-location study, please send your data to us, so that it can be included here. If this is not possible, but you wish to combine these factors with your own, select and copy the relevant data from this spreadsheet and paste them into a new one (otherwise your calculations will include hidden data). Then add your own data and calculate the bias. To obtain a new correction factor that includes your data, average the bias (B) values, expressed as a factor, i.e. -16% is -0.16. Next add 1 to this value, e.g. -0.16 + 1.00 = 0.84 in this example, then take the inverse to give the bias adjustment factor 1/0.84 = 1.19. (This will not be exactly the same as the correction factor calculated using orthogonal regression as used in this spreadsheet, but will be reasonably close).

[5] Where an annual data set falls into two years it has been ascribed to the year in which most of the data fall.

[6] Tube precision is determined as follows: G = Good precision - coefficient of variation (CV) of diffusion tube replicates is considered good when the CV of eight or more periods is less than 20%, and the average CV of all monitoring periods is less than 10%; P = Poor precision - CV of four or more periods >20% and/or average CV >10%; S = Single tube, therefore not applicable; na = not available.

To add data download a questionnaire

collocation data

Filter Mode NUM

Start | Inbox - Microsoft Outlook | USA 2009 | Ballymoney USA 2009 - ... | Microsoft Excel - diffu... | EN | 15:26

Appendix 4

From: Diffusion [Diffusion@gradko.co.uk]
Sent: 03 August 2009 12:51
To: O'Brien Lynne
Subject: NO2 Diffusion TUbe QC data
Good Afternoon

Ref yuor telephone request

As requested , the information on our NO2 diffusion tube QC/QC,

Our WASP results for 01.08 to 01.09 were as follows :

Jan08 Round 100 : Ref Value : 1.36ugNO2 Measured Value : 1.34 ugNO2 Z score -0.1 Satisfactory

1.47ugNO2 Measured Value : 1.50 ugNO2 Z score 0.2 Satisfactory

March08 Round 101 Ref Value : 0.92ug NO2 Measured Value : 0.95ugNO2 Z Score 0.2 Satifactory

Ref Value : 1.86ugNO2 Measured Value : 1.85ugNO2 Z Score 0 Satisfactory

July 08 Round 102 Ref Value : 1.37ugNO2 Measured Value : 1.42ugNO2 Z Score 0.3 Satisfactory

Ref value : 2.28ugNO2 Measured Value : 2.21ugNO2 Z score -0.2 Satisfactory

Jan09 Round 104 Ref Value : 2.02ugNO2 Measured Value : 1.85ugNO2 Z Score -0.7 Satisfactory

Ref Value : 1.22ug NO2 Measured Value : 1.21ugNO2 Z Score - 0.1 Satisfactory

Our general statement on Defra Guidance Document that has been supplied to Local Authorities is as follows :

'Our NO2 diffusion tube procedures have been amended to follow the guidelines of the DEFRA Harmonisation document related to the preparation, extraction, analysis and calculation procedures for NO2 passive diffusion tubes. As most of the procedures were already carried the out before the introduction of the Guidelines, the amendments are minimal . Our internal analysis procedures are assessed by U.K.A.S. on an annual basis for compliance to ISO17025'

Attached, is the data sheet for the NO2 Field Intercomparsion Project (NETCEN) for 2008

Regards

Gerry Stutchbury

Gradko International Ltd
St.Martins House
77 Wales Street
Winchester
SO23 0RH

+44 1962 860 331 (ph)
+44 1962 841 339 (fx)

www.gradko.co.uk

Appendix 5

Tube Location	Jan	Feb	Mar	Apr	May	Jul	Aug	Sep	Oct	Nov	Dec	Ave	B A
1N	37.40	37.09	29.47	24.29	32.92	27.35	30.66	32.13	26.21	32.94	45.38	32.35	**29.11**
2N	22.22	21.03	14.84	26.98	22.54	17.93	16.84	23.38	14.69	23.41	27.97	21.08	**18.97**
3N	14.11	13.31	9.06	7.43	8.22		7.03	11.02	8.55	14.45	17.88	11.11	**10.00**
4N	19.28	17.03	7.10	9.31	9.54	7.46	8.52	11.96	7.79	13.52	21.54	12.10	**10.89**
6N	27.98	30.30	18.71	15.80	20.41	21.54	21.99	22.57	23.24	25.55	33.75	23.80	**21.42**
7N	37.93	33.72	26.40	25.92	17.97	22.41	23.30	29.07	28.05	31.69	38.94	28.67	**25.81**
8N	45.75	44.75	17.86	34.54	31.48	31.95	34.84	31.87	19.69	35.18	43.67	33.78	**30.40**
9N	21.99		37.93	17.18	11.16	14.66	15.48	17.93	40.11	25.05	25.61	22.71	**20.44**
			Jun results missing										