QA/QC Data Ratification Report for the Automatic Urban and Rural Network, April-June 2012

Report for Department for Environment, Food and Rural Affairs, The Scottish Government, The Welsh Government, The Northern Ireland Department of Environment

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Executive summary

AEA carries out the quality assurance and control (QA/QC) activities for the Automatic Urban and Rural Monitoring Network (AURN) on behalf of the UK Department for Environment, Food and Rural Affairs (Defra), Scottish Government, Welsh Government and Department of Environment (DoE) in Northern Ireland.

Ratified hourly average data capture for the network averaged 92.9% for all pollutants (O_3, NO_2, SO_2, CO, PM_{10} and $PM_{2.5}$) during the 3-month reporting period April-June 2012. Data capture for all pollutants except $PM_{2.5}$ and PM_{10} was above 90%. There were 26 sites with data capture less than 90% for the period.

The number of monitoring sites in the AURN during this quarter was 137, of which 73 are Local Authority owned sites affiliated to the national network. Some are co-located and separately named gravimetric particulate analysers at sites with automatic analysers. Many affiliated sites have additional Defra-funded analysers installed on site.

The main reasons for data loss at the sites have been provided and these were predominantly due to instrument faults, response instability or problems associated with the replacement of analysers and infrastructure. A summary of recommendations to help improve network performance is given in Appendix 1.

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1 Introduction

This quarterly report covers the Quality Assurance and Control (QA/QC) activities undertaken by AEA to ratify automatic monitoring data from Defra and the Devolved Administrations' urban and rural air quality monitoring network (AURN) for the period 1st April – 30th June 2012. During this period there were 137 operational monitoring sites in the Network of which there are 102 urban sites, 27 rural sites and a further 8 sites in the London Air Quality Monitoring Network (LAQN) which are affiliated into the national network. There are currently 64 Defra-funded sites and 73 affiliate sites, although many affiliate sites have fully-funded PM_{10} and/or $PM_{2.5}$ analysers. Eleven sites have non-automatic particulate samplers (Partisols); some of these are co-located with FDMS analysers at Auchencorth Moss, Harwell, London North Kensington and Marylebone Road for both PM_{10} and $PM_{2.5}$.

1.1 Overview of Network Performance

Ratified hourly average data capture for the network averaged 92.9% for all pollutants (O_3, NO_2, SO_2, CO, PM_{10} and $PM_{2.5}$) during the 3 month reporting period April-June 2012 (see Table 1.1). All gaseous pollutants achieved 90% or higher data capture on average. Data capture rates are calculated using the actual data capture as hourly averages (daily for Partisol) against the total number of hours (or days) in the relevant period; service and maintenance are counted as lost data. It is permissible to discount routine service and calibration from achievable data capture targets, but this is not yet calculated. For sites starting or closing during the period, the data capture is based on the actual date starting or closing.

Table 1.1: AURN Ratified Data Capture (%) by Quarter, Apr – Jun 2012

	CO	PM_{10}	$PM_{2.5}$	NO_2	O_3	SO_2	Mean
Q1 2012	96.6	90.4	88.3	95.8	96.6	96.6	93.2
Q2 2012	98.8	87.6	87.1	94.7	97.5	94.4	92.9

Overall, 314 out of the 412 analysers (76%) achieved data capture levels above the required 90% target during this reporting period (See Table 1.2).

Table 1.2: Number of Analysers with Data Capture below 90%

Total Number Of Analysers		Q1 Jan-Mar 2012 (No. below 90%)	Q1 Apr-Jun 2012 (No. below 90%
CO	23	2	0
NO_2	119	13	12
O_3	82	7	4
PM_{10} [1]	69	14	22
$PM_{2.5}$ [1]	79	26	27
SO_2	45	4	5
Total <90%		66	70

[1] Includes FDMS, FDMS, BAM and Partisol analysers.

In total, 26 out of the 137 operational network sites in the quarter (19%) had an average data capture rate below the required 90% level for the April-June 2012 period.

2 Changes in the Network for Directive Compliance

The following sites were commissioned during this period:

Leamington Spa Rugby Road	NO_2 PM_{10} $PM_{2.5}$	21 May 2012
Walsall Woodlands	NO_2 O_3	19 June 2012
Honiton	NO_2	21 June 2012

Due to the small amount of data for this quarter, Honiton and Walsall Woodlands data will be ratified with the July-September data.

3 Generic Data Quality Issues

3.1 FDMS Performance Issues

At the time of writing, there are a number of FDMS performance issues being investigated by the QA/QC unit. Most significant is the apparent baseline offset, which can result in data being higher or lower than might be expected. In order to determine this, zero checks are being carried out by placing a zero filter over the inlet and leaving for several days. This method does allow the determination of the analyser "zero" but requires a visit by QA/QC staff and the LSO, and therefore it will take time to complete all sites. The findings and implications of these tests will be discussed in future QA/QC reports.

4 Site Specific Issues

In this section, we now discuss in turn specific site issues for sites in the following geographic groupings – London, England (except London), Scotland, Northern Ireland and Wales. Where analysers were commissioned during the period, the stated data capture for these instruments is calculated from the date of commissioning.

4.1 London

4.1.1 Data Capture

The data capture for sites in London (within the M25) for the period April-June 2012 is given in Table 4.1:

Table 4.1: Data capture for London: April-June 2012

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
London							
Camden Kerbside	-	82.8	88.5	99.5	-	-	90.3
Haringey Roadside	-	98.4	99.0	99.8	-	-	99.1
London Bexley	98.1	-	85.1	97.5	-	43.0	80.9
London Bloomsbury	99.1	99.0	99.5	95.3	99.7	99.5	98.7
London Cromwell Road 2	96.8	-	-	88.3	-	95.2	93.5
London Eltham	-	-	98.8	99.5	99.6	-	99.3
London Haringey	-	-	-	88.0	99.9	-	93.9
London Harlington	-	48.5	74.2	98.6	99.2	-	80.1
London Harrow Stanmore	-	-	80.0	-	-	-	80.0
London Hillingdon	-	-	-	99.5	99.8	-	99.6
London Marylebone Road	98.4	95.2	96.6	98.3	92.7	98.5	96.6
London Marylebone Road PARTISOL	-	97.8	97.8	-	-	-	97.8
London N. Kensington	99.5	41.2	73.0	99.3	96.3	99.5	84.8
London N. Kensington PARTISOL	-	95.6	97.8	-	-	-	96.7
London Teddington	-	-	94.4	99.6	99.7	-	97.9
London Westminster	99.1	-	57.1	98.9	99.0	99.1	90.6
Southwark A2 Old Kent Road	-	65.2	-	71.1	-	-	68.1
Tower Hamlets Roadside	99.5	-	-	98.2	-	-	98.9
Number of sites	7	9	13	15	9	6	18
Number of sites < 90%	0	4	6	3	0	1	5
Network Mean (%)	98.7	80.4	87.8	95.4	98.4	89.1	91.5

Shaded boxes indicate data capture < 90%

Data captures shown in **bold** indicate that the data are provisional and subject to further quality control.

4.1.2 Site Specific Issues

London Bexley

The SO_2 analyser suffered excessive baseline drift due to a lamp fault in April. The SO_2 cylinder subsequently became empty and the lack of calibration data resulted in the loss of data from 10 May to early August when a replacement cylinder was delivered.

London Harlington

Measured concentrations of $PM_{2.5}$ were higher than PM_{10} for the first half of April. Much of the $PM_{2.5}$ data have been deleted up to the LSO calibration on 23 April, despite replacement of the dryers on 2 April. The PM_{10} data became very noisy from 23 April, and the main valve was found not to be switching on 1 May. Noisy data persisted into June, and have been deleted.

London Harrow Stanmore

A series of valve faults, leaks and high dewpoints resulted in several periods of lost $PM_{2.5}$ data.

London North Kensington

The performance of the FDMS analysers has been poor during the quarter.$PM_{2.5}$ concentrations were higher than PM_{10} for a period and the dryers were eventually replaced on 25 June when performance improved on both instruments, although further $PM_{2.5}$ problems were encountered in Quarter 3.

Southwark A2 Old Kent Road

Excessive hut temperatures appear to have resulted in loss of both NOx and PM_{10} data The NOx analyser was removed for repair on 12 July following unstable data since the LSO calibration on 6 June. In addition, the sampling system was found to allow sampling through the excess flow at the audit on 24 July; NOx data from 6 June to 30 July have been deleted.

4.2 England (excluding London)

4.2.1 Data Capture

The data capture for sites in England for the period April-June 2012 is given in Table 4.2:

Table 4.2: Network Data Capture for 01/01/2012 to 31/03/2012 (or from start date of any new site)

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
England							
Barnsley 12	-	-	-	-	-	98.7	98.7
Barnsley Gawber	-	-	-	99.5	99.5	99.5	99.5
Bath Roadside	-	-	-	99.5	-	-	99.5
Billingham	-	-	-	95.5	-	-	95.5
Birmingham Acocks Green	-	-	98.9	99.9	89.3	99.9	97.0
Birmingham Tyburn	-	99.0	98.2	99.6	99.6	99.6	99.2
Birmingham Tyburn Roadside	-	85.6	91.9	99.4	98.4	-	93.8
Blackburn Darwen Roadside	-	-	-	94.3	-	-	94.3
Blackpool Marton	-	-	82.7	95.6	99.9	-	92.7
Bottesford	-	-	-	-	99.3	-	99.3
Bournemouth	-	-	98.9	99.6	100.0	-	99.5
Brighton Preston Park	-	-	95.6	99.7	100.0	-	98.4
Bristol Old Market	-	-	-	95.7	-	-	95.7
Bristol St Paul's	99.8	87.1	60.2	99.3	95.9	99.9	90.3
Bury Roadside	99.5	99.6	99.2	93.0	-	-	97.8
Cambridge Roadside	-	-	-	50.6	-	-	50.6
Canterbury	-	-	-	99.9	99.9	-	99.9
Carlisle Roadside	-	74.0	81.1	90.5	-	-	81.9
Charlton Mackrell	-	-	-	**89.5**	**100.0**	-	**94.7**
Chatham Centre Roadside	-	99.2	99.6	99.7	-	-	99.5
Chesterfield	-	11.4	78.1	92.1	-	-	60.5
Chesterfield Roadside	-	94.3	99.5	92.1	-	-	95.3
Coventry Memorial Park	-	-	0.0	99.5	98.9	-	66.1
Eastbourne	-	99.5	99.0	99.0	-	-	99.2
Exeter Roadside	-	-	-	99.6	99.9	-	99.8
Glazebury	-	-	-	99.8	99.9	-	99.9

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
Great Dun Fell	-	-	-	-	96.8	-	96.8
Harwell	-	99.1	99.4	94.5	99.5	99.5	98.4
Harwell PARTISOL	-	98.9	97.8	-	-	-	98.4
High Muffles	-	-	-	93.9	94.0	-	93.9
Honiton	-	-	-	**100.0**	-	-	**100.0**
Horley	-	-	-	99.7	-	-	99.7
Hull Freetown	99.0	93.8	99.6	95.9	99.8	99.9	98.0
Ladybower	-	-	-	99.8	99.9	73.5	91.1
Leamington Spa	-	99.7	99.9	82.1	99.7	99.8	96.2
Leamington Spa Rugby Road	-	98.9	97.9	99.9	-	-	98.9
Leeds Centre	99.5	68.0	71.1	99.6	99.8	88.0	87.7
Leeds Headingley Kerbside	-	98.3	98.3	91.6	-	-	96.0
Leicester Centre	99.6	99.6	99.8	91.6	99.8	99.7	98.3
Leominster	-	-	-	98.1	99.1	98.4	98.6
Lincoln Canwick Road	-	-	-	99.6	-	-	99.6
Liverpool Queen's Drive Roadside	-	-	-	99.9	-	-	99.9
Liverpool Speke	99.8	99.7	100.0	99.8	99.7	99.4	99.7
Lullington Heath	-	-	-	99.5	99.8	99.7	99.7
Manchester Piccadilly	-	-	98.5	96.1	99.9	99.9	98.6
Manchester South	-	-	-	99.8	92.8	-	96.3
Market Harborough	-	-	-	95.5	98.4	-	97.0
Middlesbrough	99.9	99.9	97.2	98.6	100.0	99.7	99.2
Newcastle Centre	100.0	99.3	99.6	99.5	100.0	98.0	99.4
Newcastle Cradlewell Roadside	-	-	-	68.4	-	-	68.4
Northampton	-	-	96.7	99.7	97.7	97.9	98.0
Norwich Lakenfields	-	81.6	92.9	99.8	99.6	99.8	94.7
Nottingham Centre	-	2.7	86.9	99.9	92.1	93.8	75.1
Oxford Centre Roadside	-	-	-	99.6	-	-	99.6
Oxford St Ebbes	-	99.3	79.3	99.7	-	-	92.8
Plymouth Centre	-	91.3	6.2	95.6	99.8	-	73.2

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
Portsmouth	-	65.3	82.3	96.1	95.7	-	84.8
Preston	-	-	98.3	96.2	99.9	-	98.1
Reading New Town	-	93.4	97.6	95.3	99.9	-	96.5
Rochester Stoke	-	99.2	96.6	99.3	99.5	96.6	98.2
Salford Eccles	98.5	84.9	87.8	97.1	98.4	98.5	94.2
Sandy Roadside	-	57.9	25.2	99.5	-	-	60.9
Scunthorpe Town	-	92.8	-	75.9	-	98.6	89.1
Sheffield Centre	96.6	94.6	92.7	96.5	96.5	90.0	94.5
Sheffield Tinsley	-	-	-	99.8	-	-	99.8
Sibton	-	-	-	-	99.9	-	99.9
Southampton Centre	99.8	99.7	99.8	99.5	99.7	99.8	99.7
Southend-on-Sea	-	-	44.8	9.2	63.5	-	39.2
St Osyth	-	-	-	97.7	98.0	-	97.8
Stanford-le-Hope Roadside	-	82.6	99.6	99.6	-	99.9	95.4
Stockton-on-Tees Eaglescliffe	-	93.2	91.6	98.9	-	-	94.6
Stoke-on-Trent Centre	-	98.7	96.5	99.7	99.8	-	98.6
Storrington Roadside	-	92.5	91.6	99.8	-	-	94.6
Sunderland Silksworth	-	-	28.0	68.2	68.1	63.0	56.8
Thurrock	-	97.4	-	98.3	98.5	**98.3**	**98.1**
Walsall Woodlands	-	-	-	**99.7**	**100.0**	-	**99.8**
Warrington	-	99.5	77.3	94.3	-	-	90.4
Weybourne	-	-	-	-	99.9	-	99.9
Wicken Fen	-	-	-	99.0	99.5	99.4	99.3
Wigan Centre	-	-	97.9	99.9	99.8	-	99.2
Wirral Tranmere	-	-	99.7	95.6	99.9	-	98.4
Yarner Wood	-	-	-	99.8	94.3	-	97.0
York Bootham	-	99.4	100.0	-	-	-	99.7
York Fishergate	-	83.4	85.0	99.6	-	-	89.3
Number of sites	11	40	50	77	53	29	84
Number of sites <	0	12	16	7	3	3	14

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
90%							
Network Mean (%)	99.3	87.9	85.9	94.7	97.4	96.2	92.9

Shaded boxes indicate data capture < 90%

Data captures shown in **bold** indicate that the data are provisional and subject to further quality control.

4.2.2 Site Specific Issues

Cambridge Roadside

A suspected sampling fault resulted in the loss of data from 27 March to 15 May.

Carlisle Roadside

Both $PM_{2.5}$ and PM_{10} were noisy and unstable throughout the quarter, resulting in some data loss.

Chesterfield

Both FDMS units had replacement dryers fitted on 18 June following periods of poor data. The PM_{10} baseline was above 5 μgm^{-3} for the whole quarter and thus the PM_{10} data have been deleted up to dryer replacement.

Coventry Memorial Park

A suspected dryer fault resulted in an ESU callout on 2 September 2011, but they were unable to fix it and the instrument was removed for workshop repair. A replacement analyser was finally installed on 3 May though problems persist following replacement and all data for the quarter have been deleted.

Leeds Centre

The site suffered from air conditioning faults during May, resulting in the loss of some data. The PM analysers were switched off to prevent damage.

Newcastle Cradlewell Roadside

The analyser was turned off several times due to air conditioning faults. The AC unit was repaired on 29 June.

Nottingham Centre

The Nottingham PM_{10} analyser shows an elevated baseline, and showed poor agreement with the $PM_{2.5}$; most of the PM_{10} data for this quarter have been deleted.

Plymouth Centre

The $PM_{2.5}$ concentrations, particularly the volatile fraction, appear too low throughout the quarter and the data have been deleted.

Portsmouth

There were problems with the air conditioning and an internal electrical fault in the cabin resulting in the loss of PM_{10} data from 25-30 May, and 4-30 June, when a new air conditioning unit was fitted. In addition, the $PM_{2.5}$ dryer required replacement on 1 May, and some days' data were lost until instrument stability was acceptable.

Sandy Roadside

The volatile fraction of both $PM_{2.5}$ and PM_{10} were noisy for a considerable part of the quarter, and a considerable quantity of data have been deleted.

Scunthorpe Town

A suspected NOx sampling fault between LSO calibrations on 31 May and 19 June; data have been deleted.

Southend-on-Sea

Following some temperature-related faults, the air conditioning unit failed on 11 May and monitoring was suspended until a replacement unit was installed on 21 June

Sunderland Silkworth

A substantial amount of data were lost as a result of the site being switched off twice due to water ingress through the roof.

York Fishergate

Some $PM_{2.5}$ and PM_{10} data were lost due to various instrument problems requiring engineer callouts.

4.3 Scotland

4.3.1 Data Capture

The data capture for sites in Scotland for the period April-June 2012 is given in Table 4.3.

Table 4.3: Data Capture April-June 2012: Scotland

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
Scotland							
Aberdeen	-	97.4	98.4	99.8	99.8	-	98.8
Aberdeen Union Street Roadside	-	-	-	96.6	-	-	96.6
Auchencorth Moss	-	100.0	74.7	-	99.9	-	91.5
Auchencorth Moss PM_{10} PM_{25} (FDMS)	-	84.3	97.4	-	-	-	90.8
Bush Estate	-	-	-	60.7	100.0	-	80.3
Dumbarton Roadside	-	-	-	97.5	-	-	97.5
Dumfries	-	-	-	99.5	-	-	99.5
Edinburgh St Leonards	99.7	71.8	72.3	99.5	94.9	98.4	89.4
Eskdalemuir	-	-	-	99.7	100.0	-	99.8
Fort William	-	-	-	90.4	93.3	-	91.8
Glasgow Centre	99.9	99.6	99.6	99.5	99.8	96.6	99.2

Glasgow Kerbside	-	71.1	84.4	99.5	-	-	85.0
Grangemouth	-	100.0	99.5	99.3	-	99.5	99.6
Grangemouth Moray	-	-	-	99.5	-	-	99.5
Inverness	-	93.4	97.8	96.8	-	-	96.0
Lerwick	-	-	-	-	99.9	-	99.9
Peebles	-	-	-	99.7	79.7	-	89.7
Strath Vaich	-	-	-	-	99.9	-	99.9
Number of sites	2	8	8	14	10	3	18
Number of sites < 90%	0	3	3	1	1	0	4
Network Mean (%)	99.8	89.7	90.5	95.6	96.7	98.2	94.7

Shaded boxes indicate data capture < 90%

Data captures shown in **bold** indicate that the data are provisional and subject to further quality control.

4.3.2 Site Specific Issues

Bush Estate

Problems with the flow and pressure board in the NOx analyser resulted in the loss of data from 18 February to 23 April. Repairs were hampered by the lack of calibration gas at this site.

Edinburgh St Leonards

The $PM_{2.5}$ and PM_{10} volatile drifted upwards from May onwards up to dryer replacement in September, becoming significantly higher than other local sites. Data from both instruments have been deleted from June to September.

Glasgow Kerbside

The FDMS PM_{10} analyser has performed poorly for some time producing noisy data and negative volatile concentrations. Data up to 28 February have been deleted.

Peebles

The ozone analyser suffered prolonged flow and pressure faults, which were ultimately fixed by replacing the flow sensor on 20 June; a further communications fault resulted in further data loss from 27-30 June.

4.4 Wales

4.4.1 Data Capture

The data capture for sites in Wales for the period April-June 2012 is given in Table 4.4.

Table 4.4: Data Capture April-June 2012: Wales

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
Wales							
Aston Hill	-	-	-	95.1	99.9	-	97.5
Cardiff Centre	92.0	46.2	46.3	91.6	92.0	91.5	76.6
Chepstow A48	-	98.8	99.8	95.4	-	-	98.0
Cwmbran	-	-	-	99.7	99.9	-	99.8
Mold	-	-	-	99.8	100.0	-	99.9
Narberth	-	97.5	-	27.9	95.6	99.8	80.2
Newport	-	88.3	95.9	94.6	-	-	92.9
Port Talbot Margam	99.5	96.6	91.7	99.6	99.5	99.5	97.7
Port Talbot Margam PM_{10} $PM_{2.5}$ (Partisol)	-	97.8	-	-	-	-	97.8
Swansea Roadside	-	99.0	98.0	99.9	-	-	99.0

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
Wrexham	-	79.1	89.0	99.6	-	99.7	91.9
Number of sites	2	8	6	10	6	4	11
Number of sites < 90%	0	3	2	1	0	0	2
Network Mean (%)	95.7	87.9	86.8	90.3	97.8	97.6	93.7

Shaded boxes indicate data capture < 90%

Data captures shown in **bold** indicate that the data are provisional and subject to further quality control.

4.4.2 Site Specific Issues

Cardiff Centre

The FDMS analysers continued to perform poorly this quarter, with numerous temperature and flow faults. At the summer audit, the connections on the dryer unit of the PM_{10} analyser were found to be the wrong way round, resulting in a main flow of zero. All June PM_{10} data have been deleted.

Narberth

The NOx analyser response had dropped substantially over the quarter and beyond. Although a repair of the pump was carried out on 22 June, the drift persisted until the photomultiplier tube was replaced at the service. Data have been deleted from 26 April to 20 July.

Wrexham

There was a loss of Partisol data from both $PM_{2.5}$ and PM_{10} from 10-15 May due to late delivery of filters. In addition, the PM_{10} suffered filter exchange faults from 6-16 April, and a number of weighing problems.

4.5 Northern Ireland (including Mace Head)

4.5.1 Data Capture

The data capture for sites in Northern Ireland (including Mace Head in the Republic of Ireland) for the period April-June 2012 is given in Table 4.5.

Table 4.5: Data Capture April-June 2012: Ireland

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
Ireland							
Mace Head	-	-	-	-	99.7	-	99.7
N Ireland							
Armagh Roadside	-	94.3	-	98.0	-	-	96.1
Ballymena Ballykeel	-	-	-	-	-	39.1	39.1
Belfast Centre	99.7	99.9	99.8	99.5	100.0	99.6	99.7
Derry	-	95.9	95.7	99.8	100.0	99.3	98.1
Lough Navar	-	98.5	-	-	100.0	-	99.2
Number of sites	1	4	2	3	3	3	5
Number of sites < 90%	0	0	0	0	0	1	1
Network Mean (%)	99.7	97.1	97.7	99.1	100.0	79.3	86.5

Shaded boxes are for data capture < 90%

Bold data captures are for data that are provisional and subject to further quality control

4.5.2 Site Specific Issues

Ballymena Ballykeel

Following a power interruption on 24 April, the logger became corrupted and data were irretrievable up to 4 May. A UV lamp failure resulted in significant data loss following a further power interruption on 30 May. The lamp was replaced on 18 June. All data have been lost from 24 April to 18 June.

4.6 Overall Data Capture

Overall data capture for each pollutant across the network for the quarter is given in Table 4.6.

Table 4.6: Data Capture by Pollutant, Entire Network for 01/04/2012 to 30/06/2012 or from start date of any new site.

Site	CO	PM_{10}	PM_{25}	NO_2	O_3	SO_2	Site Average
Number of sites	23	69	79	119	82	45	137
Number of sites < 90%	0	22	27	12	4	5	26
Network Mean (%)	98.8	87.6	87.1	94.7	97.5	94.4	92.9

Note that data capture is calculated for the whole month for each pollutant (except for new sites, which are from the start date), so additional analysers installed during the period will have reduced data captures quoted.

5 LSO Manual and AURN Hub

The QA/QC Unit has revised and reissued the LSO manual in light of procedural changes and the introduction of new types of analysers employed. This manual is available via the AURN Hub at http://uk-air.defra.gov.uk/reports/empire/lsoman/lsoman.html

Current versions of the LSO calibrations spreadsheet are also available to download from the LSO manual page of the Hub.

Appendices

Appendix 1 - Recommendations for Upgrade or Replacement of Equipment

As requested by Defra, QA/QC Unit has provided a list of suggestions for equipment that may need replacing or upgrading in the network. The following provides a summary of the outstanding issues to date since July 2005. Recommendations have been prioritised as follows:

Priority	Definition	Time-scale
High*	Immediate action necessary to avoid compromising data capture/quality or safety.	Within 2 weeks
Medium	Essential but not immediate	3-6 months
Low	Desirable but not essential	As appropriate

*Note – QA/QC Unit's practice is to notify CMCU immediately of any high priority issues at the time of the event

Table A1 Recommendations.

Recommendations February 2012	Priority	Action
ESUs are reminded of the importance of supplying service records for Partisol samplers to QA/QC Unit.	High	ESU
Zero air scrubbers to be changed for zero air cylinders at all sites (where possible).	Medium	QA/QC ESU
Recommendations August 2008	**Priority**	**Action**
Many sites require modifications to permit safe roof access for measuring PM analyser flows.	High	CMCU
Recommendations January 2008	**Priority**	**Action**
It is recommended that LSOs continue to pay particular attention to the NO_2 calibration results, to see whether the NO response is significantly higher (>10ppb) than that obtained for the zero calibration. These observations should be reported to CMCU as soon as possible.	High	LSO
It is strongly recommended that ESUs clean all NOx analyser switching valves during servicing, and ensure the valve is leak checked afterwards. Suspect leaking valves are highlighted by the QA/QC Unit during audits.	High	ESU
Recommendations January 2007		
ESUs to ensure all NOx converter software settings to be 100%.	High	ESUs to check at service

Appendix 2

Partisol Data: April-June 2012

The data capture from the Partisol samplers are given below:

Site	PM_{10}	PM_{25}	Site Average
England			
Bournemouth	-	98.9	98.9
Brighton Preston Park	-	95.6	95.6
Harwell PARTISOL	98.9	97.8	98.4
London Marylebone Road PARTISOL	97.8	97.8	97.8
London N. Kensington PARTISOL	95.6	97.8	96.7
London Westminster	-	57.1	57.1
Northampton	-	96.7	96.7
Scotland			
Auchencorth Moss	98.9	74.7	86.8
Inverness	93.4	97.8	95.6
Wales			
Port Talbot Margam PM_{10} $PM_{2.5}$	97.8	-	97.8
Wrexham	79.1	89.0	84.1
Number of sites	7	10	11
Number of sites < 90%	1	3	3
Network Mean (%)	94.5	90.3	91.4

Site specific problems

London Westminster

The Partisol suffered from frequent filter exchange failures1 & 4 Apr, 7-10 Apr: 19-28 May:9 Jun – 30 Jun and ongoing.

Auchencorth Moss

Data from the $PM_{2.5}$ Partisol were deleted from 1-11 April and 8-19 May were deleted as these were significantly higher than the corresponding FDMS data.

Wrexham

A total of 8 days data were lost due to lost records and delayed changing of filters in May.

Appendix 3

Site Details

Three new sites were commissioned during April-June 2012. Details are below.

Site	Owner	Site type	Latitude	Longitude	Pollutants
Leamington Spa Rugby Road	DEFRA	Urban Traffic	52.294884	-1.542911	NO_2 PM_{10} PM_{25}
Walsall Woodlands	Affiliated	Urban Background	52.605621	-2.030523	NO_2 O_3
Honiton	DEFRA	Urban Background	50.792287	-3.196702	NO_2

Details of all site locations can be found at http://uk-air.defra.gov.uk/interactive-map

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