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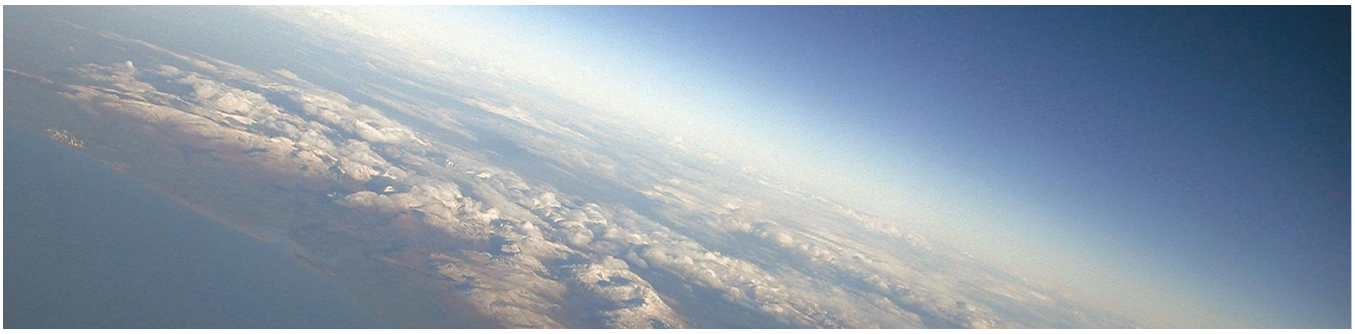

QA/QC Data Ratification Report for the Automatic Urban and Rural Network, October-December 2006, and Annual Review for 2006

Report produced for the Department for Environment, Food and Rural Affairs, Scottish Executive, Welsh Assembly Government and the DoE in Northern Ireland

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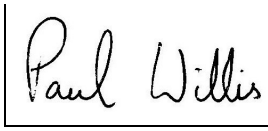
	Signature	
	Date	2 July 2007

Executive Summary

This report is in 2 parts – Part A is the data ratification report for October – December 2006 and Part B summarises the network performance and QA/QC activities during 2006

Part A Ratification Report for October-December 2006

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 Executive, Welsh Assembly Government and DoE in Northern Ireland.

Ratified hourly average data capture for the network averaged 90.3% for all pollutants (O_3, NO_2, SO_2, CO, PM_{10} and $PM_{2.5}$) during the 3-month reporting period October-December 2006. All pollutants were equal to or above 90% data capture. There were 28 sites with data capture less than 90% for the period.

Part B Annual Review for 2006

The network has undergone significant changes since it was first established in 1992. Site numbers have increased to 128 sites to date, of which 63 are Local Authority owned sites which are affiliated to the national network.

The overall data capture for 2006 was 90.8%. The annual average data capture for CO, NO_2 and PM2.5 were all slightly below 90%. There were a total of 38 sites for which data capture was below 90%, of which 16 are classified as critical for the First, Second or Third Daughter Directives.

Although overall network data capture was reasonably high at 90.8%, there were a number of critical site/analysers that missed the 90% threshold. The main reasons for data loss at these sites have been provided and these were predominantly due to instrument faults, response instability or sites out of service for relocation or refurbishment. Problems associated with air conditioning and temperature control were again significant. A summary of recommendations given in this report to help improve network performance is given in Appendix A4.

The first two TEOM FDMS analysers have been introduced into the network during the third quarter of the year, at Swansea Roadside. The QA/QC unit has developed new software to handle and ratify data from these analysers. In addition, a new section to the LSO manual has been published to cover these instruments. The Partisol LSO manual has also been updated.

QA/QC Unit continues to maintain a watching brief on new methodologies and technical advances in air quality measurement in order to keep pace with any changes that may be required in the coming years, particularly in view of the recently published European CEN standards. Procedures used in the UK network intercomparison now fully conform to the CEN requirements. In addition, the QA/QC Unit has undertaken a series of meetings with the Equipment Support Units (ESUs) to discuss data quality issues and to highlight changes required to fully implement CEN procedures.

This gives a review of the QA/QC Unit's activities during 2006. Further details are given in the individual quarterly data ratification reports already issued for 2006.

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Part A Data Ratification Report October-December 2006

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 October-December 2006. During this period there were 128 monitoring sites in the Network of which there are 90 urban sites, 24 rural sites and a further 14 sites in the London Air Quality Monitoring Network (LAQN) which are affiliated into the national network. There are currently 65 Defra-funded sites and 63 affiliate sites. Three sites (Belfast Clara Street, Northampton PM_{10} and Brighton Roadside PM_{10}) measure PM_{10} only and are included as individual sites in the total of 128, although Northampton PM_{10} is co-located with the Northampton AURN site, and Brighton Roadside PM_{10} is close to the Brighton Roadside AURN site.

1.1 Recent Changes in the Network

This section gives an overview of the main changes that have recently taken place in the network, including site closures, relocations or the addition of any new sites to the network. A summary of changes in the AURN for the period is given in Table 1.1.

Table 1.1 Changes in the Network, October-December 2006

Site	Date closed	Date commissioned	Comments
Auchencorth Moss (O_3)		29 October	Particle analysers already operational at this site from 1 Jan 2006

The QA/QC unit has also liased closely with the CMCU to update the LSO manual for Partisol and FDMS analysers and LSOs with these analysers at their sites should now follow these new procedures.

Further details of these network changes, which are undertaken in close co-operation with Bureau Veritas and the relevant Local Authorities, are given in the following sections.

1.2 Overview of Network Performance

Ratified hourly average data capture for the network averaged 90.3% for all pollutants (O_3, NO_2, SO_2, CO, PM_{10} and $PM_{2.5}$) during the 3-month reporting period October-December 2006 (see Table 1.2 below). All pollutants were 90% or higher data capture.

Table 1.2 AURN Ratified Data Capture (%) by Quarter, 2006 (Using the start date of any new site)

Data Capture (%)	CO	NO_2	O_3	PM_{10}	$PM_{2.5}$	SO_2	Network Average
Q1 Jan-Mar 2006	89.6	89.9	90.5	94.4	98.1	90.9	90.2
Q2 Apr-June 2006	90.7	90.3	92.9	95.9	96.4	92.8	92.3
Q3 July-Sept 2006	87.9	88.4	92.9	90.3	81.1	88.4	90.3
Q4 Oct-Dec 2006	90.0	90.1	93.8	95.0	90.9	91.8	90.3

Overall, 363 out of the 432 analysers (84%) achieved data capture levels above the required 90% target during this reporting period (See Table 1.3).

Table 1.3 Number of Analysers with Data Capture below 90%

Total Number Of Analysers		Q1 Jan-Mar 2006	Q2 Apr-June 2006	Q3 July-Sept 2006	Q4 Oct-Dec 2006
CO	78	17	15	15	18
NO_2	111	20	23	29	18
O_3	90	14	9	13	9
PM_{10}	72*	8	8	16	8
$PM_{2.5}$	5*	0	0	1	1
SO_2	76	16	15	24	15
Total <90%	432	75	70	98	69

*Includes TEOM, TEOM FDMS and Partisol analysers

In total, 28 out of the 128 operational network sites in the quarter (22%) had an average data capture rate below the required 90% level for the October-December 2006 period. These sites are listed in Table 1.4. The main site operational and QA/QC issues giving rise to data capture below the required 90% level are summarised in Section 4. A summary of the main recommendations made in this report to help improve network performance is given in Appendix A4.

Table 1.4 Sites with Average Data Capture < 90%, October-December 2006 (Data capture calculated from site start date)

Site	Owner	Site Average
England		
Barnsley Gawber	Affiliate	70.5
Brentford Roadside	Affiliate	89.4
Bury Roadside	Affiliate	70.4
Glazebury	DEFRA	48.1
Haringey Roadside	Affiliate	77.4
Hull Freetown	DEFRA	85.6
Ladybower	DEFRA	61.5
Leamington Spa	Affiliate	77.2
London Cromwell Road 2	DEFRA	89.4
London Southwark	Affiliate	88.9
Manchester Town Hall	DEFRA	78.4
Newcastle Centre	DEFRA	81.9
Norwich Forum Roadside	Affiliate	85.3
Plymouth Centre	DEFRA	0.0
Redcar	Affiliate	67.9

Site	Owner	Site Average
Salford Eccles	Affiliate	89.0
Sandwell West Bromwich	Affiliate	79.9
Sibton	DEFRA	70.4
Southampton Centre	DEFRA	81.1
Southwark Roadside	Affiliate	0.0
Stockport Shaw Heath	Affiliate	86.7
Sunderland Silksworth	Affiliate	83.9
Yarner Wood	DEFRA	89.7
N Ireland		
Belfast East	DEFRA	88.9
Scotland		
Dumfries	DEFRA	82.9
Fort William	DEFRA	85.5
Strath Vaich	DEFRA	44.6
Wales		
Aston Hill	DEFRA	84.3
Number of sites < 90%		28

1.3 LSO Manual

As noted in Section 1.1, the LSO Manual has been updated to include a section on the TEOM FDMS analysers. In addition, the Partisol section of the manual has been updated. LSOs with these analysers at their site should now use the new version of the manual.

Copies of the original Local Site Operator's manual on disc (CD) were distributed to the network participants at the annual LSO meeting in December 2004. Copies of the new TEOM FDMS and Partisol sections will be distributed to the relevant LSOs as these analysers are installed into the network. If LSOs have not received a copy of the manual or further copies are required please contact Andy.Cook@aeat.co.uk. The manual, including the new TEOM and FDMS sections is available electronically on the following web sites:
AURN Hub http://www.aeat.co.uk/com/AURNHUB/lsoman.html
Air Quality Archive http://www.aeat.co.uk/netcen/airqual/reports/lsoman/lsoman.html

1.4 AURN Hub Updates

The AURN project information hub website is located at[1]:
http://www.aeat.co.uk/com/AURNHUB/index.html.

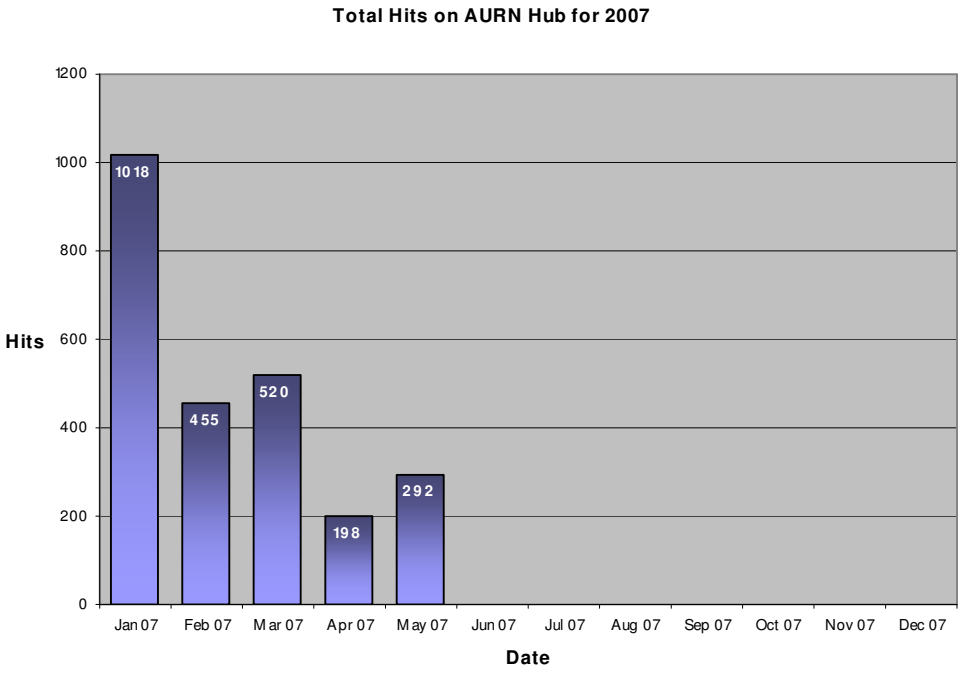
The site is regularly up-dated and some of the more recent information includes:

- Up-dated site lists (July 2006) and critical site list (July 2006)
- Monthly PM_{10} (Gravimetric) exceedences up to December 2006
- QA/QC Unit's data ratification and intercalibration report, July-September 2006
- Recent Management Unit reports (October-December 2006)
- Updated version of the LSO manual

The Hub has continued to provide a valuable source of information for interested organisations-see Figure 1.1

[1] Password protected site: username and password available from stephen.bird@aeat.co.uk

Figure 1.1 AURN Hub Monthly Usage Statistics January-May 2007



2 Generic Data Quality Issues

2.1 Progress on Monitoring Requirements of the EU Daughter Directives

Installation of all of the additional NO_x and O_3 analysers at existing sites required to comply with the third Daughter Directive (DD3) has now been completed. Further details on the third Daughter Directive can be found at:
http://www.defra.gov.uk/environment/consult/air-23daughter/index.htm

2.2 Data Capture for Critical Sites in Zones and Agglomerations

In order to meet the requirements of the Daughter Directives, any zone or agglomeration[2] with an exceedence of the limit value must be formally reported to the Commission. The critical sites are those which, if data capture falls below 90%, there will be insufficient data for the whole zone or agglomeration. In most cases the critical sites are those where there is only one site in the zone or agglomeration. However, for some pollutants (especially ozone) monitoring is required at several sites in each zone or agglomeration and hence these may all need to be classified as critical sites for that pollutant. The list of the critical sites in the

[2] A definition of zones and agglomerations can be found under "Article 5 Assessment Zones and Agglomerations Monitoring Maps" at http://www.defra.gov.uk/environment/airquality/index.htm

Network necessary to meet the requirements of the first, second and third Daughter Directives is given in Appendix A2. In total 62 sites (195 analysers) have been identified as critical for DD1, DD2 or DD3 (25 sites in agglomerations and 37 in zones).

Data capture for all 62 of the critical sites during the 3-month period October-December 2006 is given in Section 5, Table 5.2. The critical sites with less than 90% total data capture and the main reasons for data loss at these sites are given in Table 2.1 below. In total, 32 out of the 195 critical site analysers (16%) did not meet the required 90% data capture during the period October-December 2006. Note that some critical sites also measure other pollutants, which are not themselves critical.

Table 2.1 Critical sites with <90% data capture, October-December 2006

Site	CO	PM_{10}	NO_2	O_3	PM_{25}	SO_2	Site Average	Principal reason for loss
England								
Barnsley Gawber	**26.0**	-	**86.4**	**85.6**	-	83.8	**70.5**	High CO signal noise, software faults
Glazebury	-	-	**94.7**	**1.4**	-	-	**48.1**	O_3 main valve leak; power cuts
Hull Freetown	**46.9**	**95.6**	**94.8**	**95.2**	-	**95.3**	**85.6**	Erratic CO baseline
Leamington Spa	**98.4**	**98.1**	**4.2**	**98.4**	-	**86.9**	**77.2**	NOx converter fault
Newcastle Centre	**97.3**	**97.2**	**20.4**	**97.4**	-	**97.1**	**81.9**	Leak in NOx analyser
Plymouth Centre	0.0	**0.0**	0.0	0.0	-	0.0	**0.0**	Sample manifold collapsed affecting all analysers
Sibton	-	-	-	**70.4**	-	-	**70.4**	Logger faults; water in manifold
Southampton Centre	**60.6**	**74.7**	**95.3**	**99.6**	-	**75.4**	**81.1**	Air conditioning problems
Sunderland Silksworth	-	-	**74.5**	**93.4**	-	-	**83.9**	Electrical supply problems
Yarner Wood	-	-	**87.6**	**91.8**	-	-	**89.7**	Electrical supply problem following lightning strike
Scotland								
Dumfries	**50.3**	**100.0**	**98.4**	-	-	-	**82.9**	CO output very noisy
Fort William	-	-	**93.9**	**77.1**	-	-	**85.5**	Persistent erratic O_3 data
Strath Vaich	-	-	-	**44.6**	-	-	**44.6**	Numerous analyser problems; analyser swapped several times in quarter
Wales								
Aston Hill	-	-	**75.0**	**93.6**	-	-	**84.3**	Excessive NOx autocal run-on

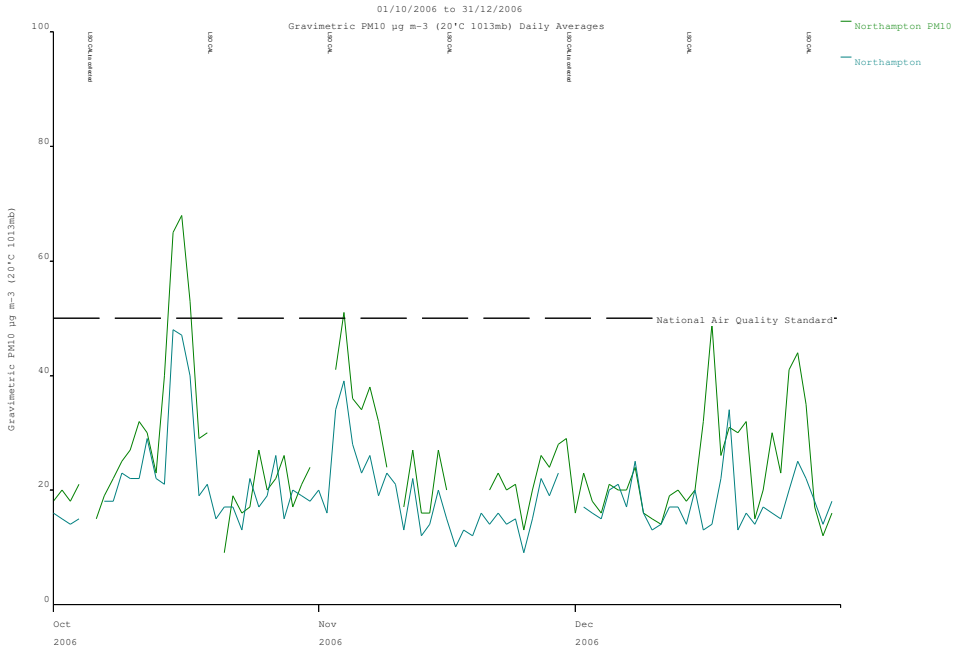
Recommendation

Every effort should be made to ensure that data capture is maximised for the critical sites. LSOs and ESUs should undertake call-outs and repairs as soon as possible to avoid unnecessary data loss at these sites.

2.3 Gravimetric PM_{10} Data Ratification

Gravimetric PM_{10} analysers (Partisols) are located at eight sites in the network (Bournemouth, Northampton, Wrexham, Dumfries, Inverness, London Westminster, Auchencorth Moss (PM_{10} and $PM_{2.5}$) and Brighton Roadside PM_{10}). The gravimetric PM_{10} analyser at Northampton is also co-located with a TEOM analyser, which provides a comparison of data from the two techniques. Gravimetric PM_{10} concentrations and the daily mean TEOM scaled by 1.3 at Northampton for the 3-month period October-December 2006 are shown in Figure 2.1. Throughout the period, the Partisol consistently overrread the TEOMx1.3 data.

Figure 2.1 Partisol and TEOM (x1.3) Concentrations at Northampton (January-December 2006)



Data capture for the gravimetric PM_{10} (Partisol) analysers for the period October-December 2006 is given in Table 2.3. All eight sites for which data are available exceeded the 90% data capture target in this quarter, with average data capture over all eight analysers of 92.9%.

Table 2.3 Gravimetric PM_{10} Data Capture (%) 2006

Site	3-months Data Capture (%) October-December 2006
Auchencorth Moss	91.3
Bournemouth	100
Brighton Roadside PM_{10}	95.7
London Westminster	93.5
Northampton	96.9
Dumfries	100

Site	3-months Data Capture (%) October-December 2006
Inverness	94.6
Wrexham	95.7

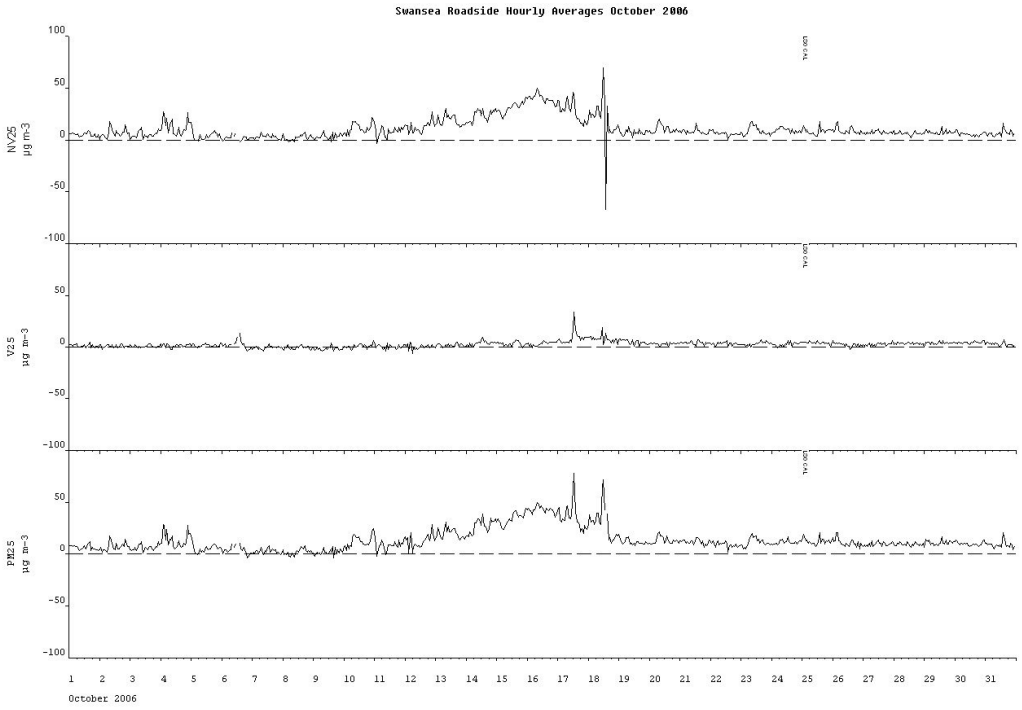
The reasons for data loss in the gravimetric analysers are reported elsewhere. Bureau Veritas has supplied the measured data, undertaken the filter weighing and calculated the particulate concentrations; AEA has ratified the results.

2.4 FDMS Data Ratification

Ratification of TEOM FDMS data

During this quarter, measurements of PM_{10} and $PM_{2.5}$ have been undertaken at Swansea Roadside using TEOM FDMS analysers. These analysers have been shown to produce data that are gravimetric equivalent with no requirement for adjustment factors. Although the operating principle is broadly similar to a TEOM, much more information and analysis is required to ensure reliable operation.

The FDMS produces two datasets: Base Mass Concentration (labelled NV, non volatile) and Reference Mass Concentration (labelled V, volatile). The analyser then adds these together to produce a third dataset, simply termed Mass Concentration. The figure below shows these three datasets in a stacked timeseries:



These timeseries plots are examined to identify any obvious spurious data, which are then subjected to further investigation.

All FDMS analysers are linked to RS232 data systems, which allows for a range of operating conditions to be recorded. Currently, the analysers are configured to record the following parameters:

Reference Mass Concentration (Volatile)
Base Mass Concentration (Non Volatile)
Ambient Temperature
Hut Temperature
External Dew Point
Sample Dew Point
Noise
Pressure Drop
Status

Mass Concentration is calculated at AEA by the addition of the Base and Reference concentrations.

There are a number of critical parameters in the list;

- Hut Temperature must be controlled within a tight range (typically 18 to 22°C), for the analyser drying system to function correctly.
- The Sample Dew Point must be at least 4°C lower than the External Dew Point, to prevent condensation forming inside the analyser.
- Noise is recorded as a surrogate for a chart recorder, as a tool to identify poorly seated filters
- Pressure Drop is recorded as a trigger to initiate filter changes, which only need to be performed once the loading reaches 90%
- Status is recorded to alarm any other performance outliers not covered by the list above.

For periods of questionable data quality, all of the above parameters, together with the Mass Concentrations are evaluated to determine whether the data are valid. At Swansea Roadside, data from the other PM analyser can also be used to determine validity of datasets.

The procedures used to ratify FDMS data will continue to be refined and enhanced as more data becomes available on the network. Many more sites will provide FDMS data during the first and second quarter of 2007.

2.5 Auto-Calibration Run-ons

Autocalibration ”run-on” is a generic problem affecting many analysers in the network and is due to autocalibration gas leaking into the sampling system during the ambient measurement period immediately after the autocalibration cycle. The problem can be identified by examining the diurnal variation of pollutant concentrations for the individual sites. Invalid measurements (usually between 01:30 and 02:00) have been removed during data ratification. This can be a serious source of data loss resulting in one hour out of twenty four being deleted, which is 4% of the annual data capture. At some sites significantly more data are being lost resulting in data capture below the 90% data capture target for the period.

The ESUs have investigated the autocalibration run-ons at many of the sites and tried different ways to resolve the problem including thorough cleaning of the solenoid valves and installation of Permapure or silica gel driers. In most cases this has improved the situation but it has not always eliminated the problem completely.

The 32 sites (35 analysers) showing continuing problems with the autocalibration run-on during October-December 2006 are given in Table 2.5. Any autocalibration run-on data that look visibly significant have been deleted from these data sets during ratification.

Table 2.5 Estimate of Spike or Dip due to Auto-calibration Run-on: October-December 2006

Site	Pollutant	Run-On Conc	Autocal Conc	Hours lost	Months
London Southwark	CO	0		**5**	Oct - Dec
Stockport Shaw Heath	NO	5		2	Oct-Dec
Aberdeen	NO_2	3	200	1	Oct
Aston Hill	NO_2	3.9	50	**6**	Oct
				4	Nov
				3	Dec
Belfast Centre	NO_2	5	300	1	Oct - Dec
Birmingham Centre	NO_2	5	750	1	Oct - Nov
Bournemouth	NO_2	2	600	1	Oct and Dec
Bury Roadside	NO_2	12	350	1	Oct - Dec
Edinburgh St Leonards	NO_2	2	500	1	Dec
Eskdalemuir	NO_2	1.1	500	**4**	Oct
Fort William	NO_2	2	350	1	Oct - Dec
Glazebury	NO_2	3.9	150	1	Nov
Harwell	NO_2	1	200	3	Nov
Hove Roadside	NO_2	3	450	1	Nov
Hull Freetown	NO_2	4	200	1	Dec
Leominster	NO_2	3	500	2	Oct
				1	Nov-Dec
Liverpool Speke	NO_2	2	250	1	Oct-Dec
London Bloomsbury	NO_2	6	700	1	Oct-Nov
London Westminster	NO_2	3	412	1	Oct-Nov
Lullington Heath	NO_2	0.8	300	1	Oct-Nov
Manchester Town Hall	NO_2	3	450	1	Oct-Dec
Newcastle Centre	NO_2	3	300	1	Oct-Dec
Southampton Centre	NO_2	5	500	1	Oct-Dec
Stockport Shaw Heath	NO_2	8	1100	2	Oct-Dec
Thurrock	NO_2	4	400	1	Oct-Dec
Wrexham	NO_2	3	350	1	Oct-Dec
Yarner Wood	NO_2	0.6	200	**3**	Dec
Stoke-on-Trent Centre	O_3	-2	1000	1	Oct-Dec
Belfast East	SO_2	1	400	1	Dec
Bradford Centre	SO_2	-1		1	Nov
Harwell	SO_2	0.2	175	1	Nov
London Brent	SO_2	0.5	900	1	Oct-Nov
London Southwark	SO_2	-2		**4**	Oct-Dec

Site	Pollutant	Run-On Conc	Autocal Conc	Hours lost	Months
Scunthorpe Town	SO_2	1	500	1	Nov
Wirral Tranmere	SO_2	-1	450	1	Nov-Dec

Recommendations

ESU to investigate and minimise effect where possible, especially at sites with large autocalibration run-ons or where data loss is in excess of 1 hour.
QA/QC Unit and CMCU have held meetings with the Equipment Support Units to discuss the autocalibration run-ons and to identify ways to resolve the problem. Solutions to the problems have been identified in many cases, and the necessary hardware upgrades are being installed either at routine services, or through call-outs.

Aston Hill, Leominster and Yarner Wood (all NO_2), and London Southwark (CO and SO_2), should be prioritised as at least 2 hours per day are being lost at these sites. Bournemouth, Edinburgh, Eskdalemuir, Fort William, Harwell, Stockport Shaw Heath and Leominster have been highlighted as a priority in previous reports.

In the meantime, we recommend that the autocalibration devices be adjusted at the problem sites to reduce the concentration of the span gas. It is strongly advised that NO_2 autocalibration span concentrations of less than 200ppb (urban sites) and 100ppb (rural sites) are used throughout the network.

3 Site Specific Issues

3.1 Stockport Shaw Heath NOx

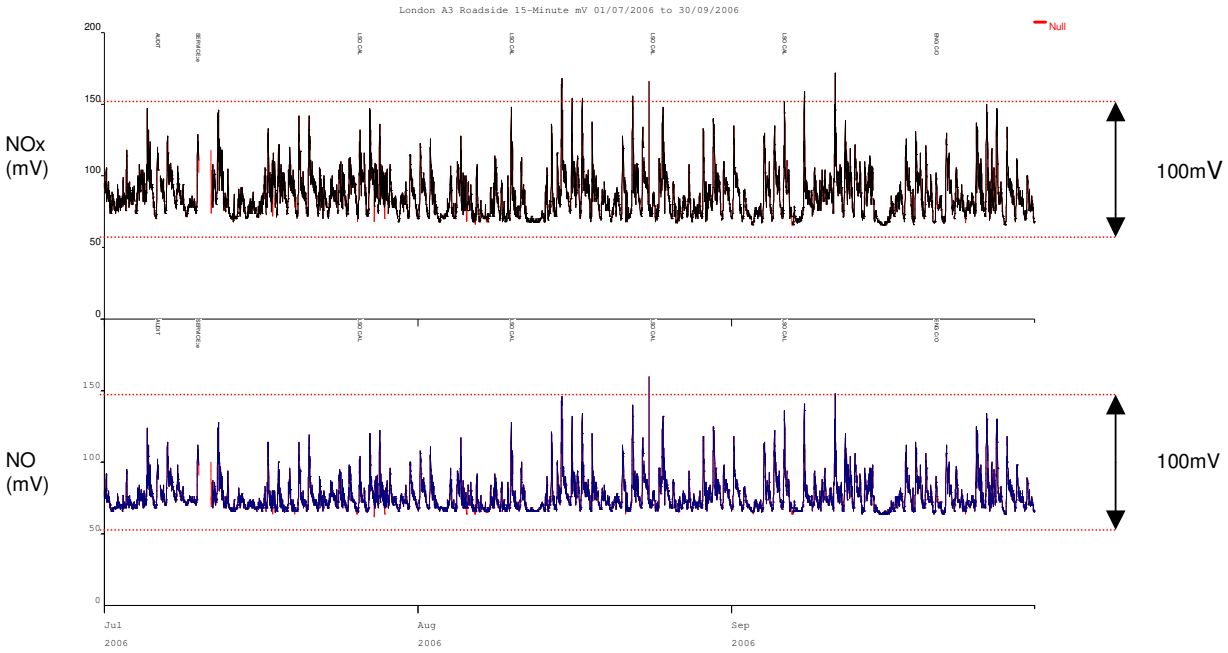
The calibrations of the Stockport Shaw Heath NOx analyser have shown there to be significant response (~50ppb) on the NO channel when NO_2 gas is used during routine calibrations and at audit. This results from a leaking switching valve, where sample gas is allowed through the NOx converter during the NO measurement cycle.

This will result in a significant underestimate of the NO_2 concentration in ambient air, and so the NO_2 data have been deleted from mid-November to the end of the quarter. Some data will also be lost in quarter 1 2007.

3.2 London A3 Roadside NOx

The range settings on the NOx analyser at London A3 Roadside are very high; in addition a considerable zero offset has been applied. The result of these is that the monitoring data are compressed in a range of approximately 150mV. This is shown in Figure 3.1. The minimum resolution of the analyser is therefore approximately 3.5ppb; this will cause large uncertainties in the data.

Figure 3.2 London A3 Roadside Nox and NO data



Recommendation

The London A3 NOx analyser should be adjusted to a more appropriate operating range

3.3 Plymouth

The roof at Plymouth was reported as partially collapsed early in 2006; however, the situation worsened later in the year, and investigation revealed the sample manifold may have been restricted. The measured data appeared to be too low, but the O_3 analyser was reading too high by 40%. It was therefore decided that the data had been compromised by the manifold problem, and all data were deleted from August 2006 to January 2007.

It has been noted that the design of roof at this site prevents the PM_{10} head from being accessed for cleaning.

3.4 Other Analysers Highlighted in Recent Reports

Several analysers have been highlighted recently as being of concern to the QA/QC unit. An update is given in Table 3.2

Table 3.2 Status of Analysers Highlighted in Previous Reports

Site	Analyser	Fault	Current status
Cwmbran	SO_2	Unstable response	Now fixed
Glazebury	O_3	Analyser drift	Appears to be repaired; will be checked at next audit

Site	Analyser	Fault	Current status
Bolton	NOx	Various	Still exhibiting unstability in December, 14 days deleted
London Westminster	CO	Unstable response	OK in Q4
Weybourne	O_3	No manual calibrations or IZS	No progress reported
Salford Eccles	CO	Constant zero baseline	No progress reported
Rural CO analysers	CO	Baseline drift	Drift still evident
Bush	NOx	Succession of analyser faults	Now fixed
Narberth	O_3	Leak	Quality of O_3 data still uncertain; significant outlier at summer 2006 and winter 2007 audits. Installation of duplicate analyser still awaited.
Various	Rural ozone analysers	Temporary instruments installed some of which have no autocals	Two analysers have been upgraded by the manufacturer and are currently under test by the ESU. Problems with these analysers were noted at Strath Vaich during Q4

Recommendation

QA/QC Unit would like to seek clarification from the Equipment Support Unit/manufacturer as to the current situation regarding the reason for the problems and what plans are in place to resolve them. We recommend that immediate attention is given to the outstanding issues as the majority of these instruments are located at critical sites.

4 Sites with Data Capture Below 90%

4.1 Sites with Low Data Capture

The following section provides a summary of the main site analyser operational problems, which have resulted in data capture below the required 90% level during the reporting period October-December 2006 (Table 4.1). The number of days and hours of data lost for each cause is also given. In some cases the data gap extends beyond this three-month reporting period.

Table 4.1 Sites with data capture below 90% October-December 2006
(Using the start date of any new site or end date of site closed)

01/10/2006 to 31/12/2006 Gaps in 15-minute table >= 6 hours and data capture <= 90%

Pollutant	Data Cap. (%)	Start date	End date	Reason	Comments	Number of days	Number of hours
England							
Barnsley Gawber							
CO	26.00%	25-Sep-06	29-Nov-06	High noise	Noisy response	65.1	1563
		06-Dec-06	07-Dec-06	Manifold fault	Eng c/o manifold fan failed	1	24
		19-Dec-06	20-Dec-06	Instrument fault	System software and modem fault	0.8	19
		23-Dec-06	27-Dec-06	Instrument fault	System software and modem fault	4.1	99
		29-Dec-06	02-Jan-07	Instrument fault	System software and modem fault	3.7	89
NO2	86.40%	13-Oct-06	13-Oct-06	Instrument removed for repair	Ambirak re-installed	0.3	8
		14-Oct-06	16-Oct-06	Instrument removed for repair	Ambirak re-installed	2.2	52
		17-Oct-06	17-Oct-06	Instrument removed for repair	Ambirak re-installed	0.3	8
		06-Dec-06	07-Dec-06	Manifold fault	Eng c/o manifold fan failed	1	24
		19-Dec-06	20-Dec-06	Instrument fault	System software and modem fault	0.8	19
		23-Dec-06	27-Dec-06	Instrument fault	System software and modem fault	4.2	101
		29-Dec-06	02-Jan-07	Instrument fault	System software and modem fault	3.7	89
O3	85.60%	13-Oct-06	13-Oct-06	Instrument fault	System software fault	0.3	8
		14-Oct-06	16-Oct-06	Instrument fault	System software fault	2.2	52
		17-Oct-06	18-Oct-06	Instrument fault	Eng c/o manifold fan failed	1.3	31
		06-Dec-06	07-Dec-06	Manifold fault	Eng c/o manifold fan failed	1	24
		19-Dec-06	20-Dec-06	Instrument fault	System software and modem fault	0.8	19
		23-Dec-06	27-Dec-06	Instrument fault	System software and modem fault	4.1	99
		29-Dec-06	02-Jan-07	Instrument fault	System software and modem fault	3.7	89
SO2	83.80%	13-Oct-06	13-Oct-06	Instrument fault	System software fault	0.3	8
		14-Oct-06	16-Oct-06	Instrument fault	System software fault	2.2	52
		17-Oct-06	17-Oct-06	Instrument fault	System software fault	0.3	8
		06-Dec-06	07-Dec-06	Manifold fault	Eng c/o manifold fan failed	1.1	26
		19-Dec-06	20-Dec-06	Instrument fault	System software and modem fault	0.8	19
		23-Dec-06	02-Jan-07	Instrument fault	System software and modem fault	10.3	247
Bolton							
NO2	76.90%	13-Oct-06	16-Oct-06	No mV data collected	No data collected. Probably a comms fault	3.4	82
		29-Oct-06	30-Oct-06	Instrument fault	Unstable baseline	0.4	9
		07-Nov-06	07-Nov-06	High noise	Nulling of erratic negative data	0.3	6
		18-Dec-06	31-Dec-06	Instrument fault	Looks like an analyser fault	14	335
SO2	89.00%	13-Oct-06	16-Oct-06	No mV data collected	No data collected. Probably	3.4	82

					a comms fault		
		13-Nov-06	15-Nov-06	Switched out-of-service	ENG C/O Cooler failed. Peltier device heat sink compound replaced	1.8	42
		11-Dec-06	15-Dec-06	No mV data collected	No data Collected	3.8	92
Brentford Roadside							
CO	79.30%	05-Oct-06	24-Oct-06	Sampling fault	Call out for flow fault	18.9	453
Bury Roadside							
CO	74.30%	27-Jul-06	23-Oct-06	Unknown	Poor data	88.5	2123
NO2	71.20%	28-Sep-06	23-Oct-06	Logger fault	PC logger failure	25.7	616
O3	74.40%	28-Sep-06	23-Oct-06	Logger fault	PC logger failure	25.7	616
PM10	72.50%	28-Sep-06	25-Oct-06	Logger fault	PC logger failure	27.4	658
SO2	59.60%	28-Sep-06	23-Oct-06	Logger fault	PC logger failure	25.7	616
		01-Nov-06	15-Nov-06	Instrument fault	Faulty analyser power supply.	13.8	332
Glazebury							
O3	1.40%	02-Oct-06	02-Feb-07	Instrument fault	Data deleted by QA/QC Unit -main valve leak	123	2955
Haringey Roadside							
NO2	55.80%	29-Sep-06	10-Nov-06	Pump fault	Sample pump replaced.	42.1	1010
Hull Freetown							
CO	46.90%	23-Jul-06	11-Nov-06	Instrument fault	Optical bench fault	111	2653
		14-Nov-06	14-Nov-06	Instrument fault	No autocal. Upgraded software	0.3	6
		23-Nov-06	30-Nov-06	Instrument fault	ENG C/O Fixed autocal problem	7.5	179
Ladybower							
NO2	0.00%	27-Sep-06	31-Jan-07	Instrument fault	PMT Fault (thermister & cooler)	127	3040
O3	92.30%	11-Oct-06	16-Oct-06	Service	Power switched off for tree cutting	128	5.3
		19-Oct-06	20-Oct-06	Site Off	Callout to fix NOx	30	1.3
SO2	92.3%	27-Sep-06	27-Sept-06	Audit	QA/QC audit	8	0.3
		11-Oct-06	16-Oct-06	Service	Power switched off for tree cutting	128	5.3
		19-Oct-06	20-Oct-06	Off line	Callout for NOx	30	1.3
Leamington Spa							
NO2	4.20%	04-Oct-06	28-Feb-07	NO2 converter fault	Faulty converter	147	3530
SO2	86.90%	30-Aug-06	11-Oct-06	Instrument fault	UV lamp fault - lamp driver board repalced	42.4	1018
		26-Dec-06	27-Dec-06	Logger fault	Logger configured incorrectly	1	25
London Cromwell Road 2							
SO2	79.20%	30-Sep-06	17-Oct-06	Instrument fault	Eng C/O flow fault and service	17.3	414
		02-Nov-06	03-Nov-06	Power cut		1	24
		11-Nov-06	12-Nov-06	No mV data collected	Telemetry problem	0.5	12

London Marylebone Road							
CO	80.30%	26-Jul-06	18-Oct-06	Logger fault	Ongoing logging problems.	84.2	2020
London Southwark							
SO2	82.50%	19-Dec-06	24-Dec-06	Unstable response	Unstable baseilne	4.5	107
Manchester Town Hall							
CO	60.00%	10-Oct-06	15-Nov-06	High noise	Optical components cleaned	36	865
Newcastle Centre							
NO2	20.40%	10-Oct-06	21-Dec-06	Instrument fault	Leaking measurement cell.	72.3	1735
Norwich Centre							
PM10	89.90%	18-Jun-06	09-Oct-06	Air Conditioning or Temp fault	Air Con failure	113	2716
Norwich Forum Roadside							
NO2	85.30%	07-Oct-06	20-Oct-06	Instrument fault	Loan unit replaced together with logger	13	312
Plymouth Centre (See Section 3.3)							
CO	0.00%	26-Jul-06	31-Jan-07	Unstable response	Roof partially collapsed, damaging the manifolds	190	4548
NO2	0.00%	01-Aug-06	31-Jan-07	ESU service	Roof partially collapsed, damaging the manifolds	184	4416
O3	0.00%	20-Feb-06	31-Jan-07	ESU service	Roof partially collapsed, damaging the manifolds	346	8293
PM10	0.00%	22-Jul-06	09-Feb-07	Instrument fault	Roof partially collapsed, damaging the manifolds	202	4848
SO2	0.00%	01-Aug-06	31-Jan-07	ESU service	Roof partially collapsed, damaging the manifolds	184	4416
Reading New Town							
NO2	72.20%	12-Oct-06	13-Oct-06	Instrument fault	No mV data for NOx only suspect instrument fault	0.6	15
		18-Oct-06	11-Nov-06	Instrument fault	ESU replaced converter	23.7	569
		06-Dec-06	06-Dec-06	Logger fault	logger fault or possible power cut	0.5	13
Redcar							
CO	58.20%	29-Sep-06	02-Oct-06	Air Conditioning fault	Site tripping due to a/c fault	2.8	66
		16-Oct-06	06-Nov-06	Air Conditioning fault	Site tripping due to a/c fault	20.9	501
		13-Nov-06	29-Nov-06	Air Conditioning fault	Air con fault. Switched off CO and SO2	16	383
NO2	56.10%	29-Sep-06	02-Oct-06	Air Conditioning fault	Site tripping due to a/c fault	2.8	68
		16-Oct-06	01-Nov-06	Air Conditioning fault	Site tripping due to a/c fault	15.6	374
		07-Nov-06	30-Nov-06	Air Conditioning fault	Air con fault. Switched off CO and SO2	23	553
O3	80.10%	29-Sep-06	02-Oct-06	Air Conditioning fault	Site tripping due to a/c fault	2.7	65
		16-Oct-06	31-Oct-06	Air Conditioning fault	Site tripping due to a/c fault	15	361
		14-Nov-06	14-Nov-06	Air Conditioning fault	Site tripping due to a/c fault	0.5	11
		15-Nov-06	15-Nov-06	Air Conditioning fault	Site tripping due to a/c fault	0.8	19
PM10	81.40%	29-Sep-06	02-Oct-06	Air Conditioning fault	Site tripping due to a/c fault	2.6	62
		17-Oct-06	01-Nov-06	Air Conditioning fault	Site tripping due to a/c fault	14.9	358
SO2	63.90%	29-Sep-06	02-Oct-06	Air Conditioning fault	Site tripping due to a/c fault	2.8	68
		16-Oct-06	31-Oct-06	Air Conditioning fault	Site tripping due to a/c fault	15.2	365

		13-Nov-06	29-Nov-06	Air Conditioning fault	Air con fault. Switched off CO and SO2	16.1	387
Rotherham Centre							
SO2	79.00%	02-Nov-06	21-Nov-06	Instrument fault	Replaced kicker	19.3	463
Salford Eccles							
CO	89.60%	30-Aug-06	09-Oct-06	ESU service	Service and intrument fault	40.2	964
SO2	60.70%	10-Oct-06	15-Nov-06	High noise	Very noisy signal	35.8	858
Sandwell West Bromwich							
CO	89.80%	26-Oct-06	01-Nov-06	Instrument fault	ENG C/O Source warning. Replaced sync motor	5.7	136
		17-Dec-06	18-Dec-06	Unstable response	Probably IR source or chopper motor	0.3	7
		26-Dec-06	27-Dec-06	Instrument fault	Probably IR source or chopper motor	2	48
NO2	36.90%	15-Aug-06	27-Nov-06	Instrument fault	Unstable and high levels	105	2515
Sibton							
O3	70.40%	23-Oct-06	27-Oct-06	Logger fault	Logger fault prior to service	3.5	84
		10-Nov-06	04-Dec-06	Logger fault	ENG C/O Flow & Logger faults	23.7	568
Southampton Centre							
CO	60.60%	09-Oct-06	14-Nov-06	Unstable response	Unstable and noisy output	36	864
PM10	74.70%	09-Oct-06	01-Nov-06	Air Conditioning fault	Aircon failure	23	551
SO2	75.40%	10-Oct-06	01-Nov-06	Air Conditioning fault	Aircon failure	22.1	531
Southwark Roadside							
CO	0.00%	09-Feb-06	08-Mar-07	Monitoring suspended	Site closed	393	9420
NO2	0.00%	21-Feb-06	08-Mar-07	Monitoring suspended	Site closed	380	9129
SO2	0.00%	08-Feb-06	08-Mar-07	Monitoring suspended	Site closed	394	9454
Stockport Shaw Heath (See Section 3.1)							
NO2	47.10%	15-Nov-06	14-Feb-07	Instrument fault	Switching valve leak	91	2185
Stockton-on-Tees Yarm							
CO	89.00%	07-Oct-06	17-Oct-06	Instrument fault	ENG C/O Flatlining. Cleaned and adjusted	9.9	237
Sunderland Silksworth							
NO2	74.50%	02-Oct-06	25-Oct-06	Power cut	Power spikes due to supply fault	23.1	554
Tower Hamlets Roadside							
CO	85.40%	31-Oct-06	02-Nov-06	Rapid zero or sensitivity drift	Rapid baseline drift ERG reset baseline on the 2nd.	2.3	54
		05-Dec-06	15-Dec-06	Instrument fault	Fixed bench motor.	10.5	251
Wirral Tranmere							
SO2	69.70%	29-Nov-06	25-Dec-06	Instrument fault	ENG C/O potential lamp fault	26	624
Yarner Wood							

NO2	87.60%	04-Oct-06	10-Oct-06	Communication fault	Modem fault prior to service	5.9	142
		27-Nov-06	28-Nov-06	Power cut		0.7	17
		03-Dec-06	04-Dec-06	Power cut		0.5	11
N Ireland							
Belfast Centre							
CO	88.00%	14-Oct-06	14-Oct-06	No mV data collected	No data collected. - site off	0.6	15
		03-Dec-06	12-Dec-06	Flat response	Flat analyser response.	9.5	229
O3	88.20%	11-Oct-06	20-Oct-06	Instrument fault	ENG C/O Locking in zero measurement	9.4	225
		06-Nov-06	07-Nov-06	Instrument fault	ENG C/O Replaced IZS UV lamp	0.8	20
Belfast East							
SO2	88.90%	03-Dec-06	12-Dec-06	Pump fault	LSO C/O. Water ingress.Pump failed.	9.1	218
Scotland							
Dumfries							
CO	50.30%	30-Sep-06	15-Nov-06	High noise	Very noisy output	45.5	1093
Eskdalemuir							
Fort William							
O3	77.10%	20-Sep-06	13-Oct-06	Unstable response	Relay board fault	22.9	549
		20-Dec-06	28-Dec-06	Unstable response	LSO filter replacement error	8.3	198
Glasgow Centre							
SO2	84.20%	04-Oct-06	18-Oct-06	Instrument fault	Spurious data	14.3	342
Glasgow Kerbside							
PM10	89.50%	14-Nov-06	23-Nov-06	Unstable response	Instability after calibration on 14/11/06	9	217
Strath Vaich							
O3	44.60%	11-Nov-06	12-Jan-07	Instrument fault	Unspecified fault - removed for repair	62.3	1494
Wales							
Aston Hill							
NO2	75.00%	26-Sep-06	04-Oct-06	High noise	Noisy response	8	193
		05-Oct-06	05-Oct-06	Autocal run-on		0.3	6
		06-Oct-06	06-Oct-06	Autocal run-on		0.3	6
		07-Oct-06	07-Oct-06	Autocal run-on		0.3	6
		08-Oct-06	08-Oct-06	Autocal run-on		0.3	6
		09-Oct-06	09-Oct-06	Autocal run-on		0.3	6
		10-Oct-06	10-Oct-06	Autocal run-on		0.3	6
		11-Oct-06	11-Oct-06	Autocal run-on		0.3	6
		12-Oct-06	12-Oct-06	Autocal run-on		0.3	6
		13-Oct-06	13-Oct-06	Autocal run-on		0.3	6
		14-Oct-06	14-Oct-06	Autocal run-on		0.3	6
		15-Oct-06	15-Oct-06	Autocal run-on		0.3	6
		16-Oct-06	16-Oct-06	Autocal run-on		0.3	6

		17-Oct-06	17-Oct-06	Autocal run-on		0.3	6
		18-Oct-06	18-Oct-06	Autocal run-on		0.3	6
		19-Oct-06	19-Oct-06	Autocal run-on		0.3	6
		20-Oct-06	20-Oct-06	Autocal run-on		0.3	6
		21-Oct-06	21-Oct-06	Autocal run-on		0.3	6
		22-Oct-06	22-Oct-06	Autocal run-on		0.3	6
		23-Oct-06	23-Oct-06	Autocal run-on		0.3	6
		24-Oct-06	24-Oct-06	Autocal run-on		0.3	6
		25-Oct-06	25-Oct-06	Autocal run-on		0.3	6
		26-Oct-06	26-Oct-06	Autocal run-on		0.3	6
		27-Oct-06	27-Oct-06	Autocal run-on		0.3	6
		28-Oct-06	28-Oct-06	Autocal run-on		0.3	6
		28-Oct-06	31-Oct-06	Power cut		3.6	86
		30-Dec-06	31-Dec-06	Power cut		0.8	18
Port Talbot							
PM10	89.00%	26-Sep-06	03-Oct-06	Flat response	flat zero response data	7	167
		22-Dec-06	29-Dec-06	Instrument fault	ENG C/O Showing flow fault - replaced filter	7.1	171
Swansea Roadside							
PM10	85.20%	06-Oct-06	07-Oct-06	QAQC audit	AUDIT Failed leak test on Aux and main flows	0.8	18
		11-Oct-06	13-Oct-06	High noise	Very noisy output	2.6	62
		28-Oct-06	29-Oct-06	High noise	Very noisy output	0.8	18
		11-Nov-06	14-Nov-06	Spurious data	PM2.5 concentrations greater than PM10	2.3	56
		16-Nov-06	17-Nov-06	High noise	Very noisy output	0.8	18
		20-Nov-06	21-Nov-06	No mV data collected	No mV data	1	24
		04-Dec-06	07-Dec-06	High noise	Very noisy output	3.1	74
PM25	58.70%	17-Nov-06	21-Nov-06	Switched out-of-service	Set to sample PM10 as a test	4	96
		28-Nov-06	05-Jan-07	Instrument fault	Unstable then removed	37.9	910
Wrexham							
CO	89.30%	24-Oct-06	02-Nov-06	Instrument fault	ENG C/O CO wheel fault	9.3	223

5 Ratified Data Capture Statistics

Table 5.1 provides the ratified data capture figures for each site for the 3-month period October-December 2006. Data capture values below 90% are shown in the shaded boxes.

Table 5.1 Ratified Network Data Statistics: October-December 2006
(Using the start date of any new site or end date of site closed)

Network Data Capture for 01/10/2006 to 31/12/2006 from start date of any new site

Site	Owner	CO	PM_{10}	NO_2	O3	PM_{25}	SO_2	Site Average
England								
Barnsley 12	DEFRA	-	-	-	-	-	94.7	94.7
Barnsley	Affiliate	**26.0**	-	**86.4**	**85.6**	-	83.8	**70.5**

Site	Owner	CO	PM_{10}	NO_2	O3	PM_{25}	SO_2	Site Average
Gawber								
Bath Roadside	Affiliate	99.4	-	99.4	-	-	-	99.4
Billingham	DEFRA	-	-	98.9	-	-	-	98.9
Birmingham Centre	DEFRA	94.6	98.9	95.9	92.3	-	98.5	96.0
Birmingham Tyburn	Affiliate	99.5	93.6	99.5	99.6	-	99.5	98.4
Blackpool Marton	DEFRA	**99.8**	**98.3**	**99.5**	**99.3**	-	**99.4**	**99.3**
Bolton	Affiliate	95.5	95.2	76.9	94.9	-	89.0	90.3
Bottesford	Affiliate	-	-	-	96.5	-	-	96.5
Bournemouth	Affiliate	**99.3**	**100.0**	**93.8**	**100.0**	-	**99.8**	**98.6**
Bradford Centre	DEFRA	96.9	96.9	96.7	96.7	-	95.3	96.5
Brentford Roadside	Affiliate	79.3	-	99.6	-	-	-	89.4
Brighton Preston Park	DEFRA	-	-	**96.9**	**96.8**	-	-	**96.9**
Brighton Roadside	Affiliate	99.6	-	99.6	-	-	-	99.6
Brighton Roadside PM10	Affiliate	-	**95.7**	-	-	-	-	**95.7**
Bristol Old Market	Affiliate	99.9	-	99.6	-	-	-	99.7
Bristol St Paul's	DEFRA	96.9	99.3	99.2	100.0	-	99.7	99.0
Bury Roadside	Affiliate	74.3	72.5	71.2	74.4	-	59.6	70.4
Cambridge Roadside	Affiliate	-	-	97.1	-	-	-	97.1
Camden Kerbside	Affiliate	-	99.8	99.3	-	-	-	99.5
Canterbury	Affiliate	-	**98.6**	93.9	-	-	-	**96.2**
Coventry Memorial Park	DEFRA	**99.7**	**99.8**	**99.6**	**99.6**	-	**99.7**	**99.7**
Exeter Roadside	Affiliate	99.2	-	99.2	99.2	-	99.2	99.2
Glazebury	DEFRA	-	-	**94.7**	**1.4**	-	-	**48.1**
Great Dun Fell	DEFRA	-	-	-	**99.4**	-	-	**99.4**
Haringey Roadside	Affiliate	-	99.1	55.8	-	-	-	77.4
Harwell	DEFRA	-	99.6	95.2	99.3	99.7	97.9	98.3
High Muffles	DEFRA	-	-	**93.8**	**93.7**	-	-	**93.8**
Hove Roadside	Affiliate	99.4	-	93.9	-	-	**99.0**	**97.4**
Hull Freetown	DEFRA	**46.9**	**95.6**	**94.8**	**95.2**	-	**95.3**	**85.6**
Ladybower	DEFRA	-	-	0.0	92.3	-	92.3	61.5
Leamington Spa	Affiliate	**98.4**	**98.1**	**4.2**	**98.4**	-	**86.9**	**77.2**
Leeds Centre	DEFRA	95.7	99.0	99.7	99.5	-	99.7	98.7
Leicester Centre	DEFRA	**99.6**	**99.4**	**99.6**	**99.5**	-	**99.6**	**99.5**
Leominster	DEFRA	-	-	**93.1**	**99.9**	-	-	**96.5**
Liverpool Speke	DEFRA	**99.4**	**99.2**	**95.2**	**99.4**	-	**99.4**	**98.5**
London A3 Roadside	DEFRA	99.5	99.7	98.8	-	-	-	99.4

Site	Owner	CO	PM_{10}	NO_2	O3	PM_{25}	SO_2	Site Average
London Bexley	Affiliate	99.7	99.2	99.6	91.0	-	98.9	97.7
London Bloomsbury	DEFRA	93.8	99.5	96.6	99.6	98.4	99.5	97.9
London Brent	Affiliate	99.4	99.0	99.0	99.1	-	95.5	98.4
London Bromley	Affiliate	-	-	99.5	-	-	-	99.5
London Cromwell Road 2	DEFRA	94.6	-	94.5	-	-	79.2	89.4
London Eltham	Affiliate	-	97.9	98.7	99.1	-	99.4	98.8
London Hackney	Affiliate	97.7	-	99.1	97.3	-	-	98.0
London Haringey	Affiliate	-	-	-	99.5	-	-	99.5
London Harlington	Affiliate	97.4	99.1	95.7	96.5	-	-	97.2
London Hillingdon	DEFRA	99.3	95.8	99.0	99.5	-	99.5	98.6
London Lewisham	Affiliate	-	-	91.8	99.6	-	99.3	96.9
London Marylebone Road	Affiliate	80.3	98.5	98.2	98.0	99.4	96.8	95.2
London N. Kensington	Affiliate	99.2	99.2	99.4	99.5	-	99.6	99.4
London Southwark	Affiliate	81.3	-	98.2	93.8	-	82.5	88.9
London Teddington	Affiliate	-	-	98.0	98.2	-	98.2	98.1
London Wandsworth	Affiliate	-	-	99.5	99.4	-	-	99.4
London Westminster	DEFRA	99.5	93.5	94.8	99.5	-	99.0	97.2
Lullington Heath	DEFRA	-	-	92.5	95.2	-	95.2	94.3
Manchester Piccadilly	DEFRA	99.4	97.5	99.5	98.1	-	99.7	98.8
Manchester South	Affiliate	-	-	99.3	99.4	-	99.4	99.4
Manchester Town Hall	DEFRA	60.0	-	96.8	-	-	-	78.4
Market Harborough	DEFRA	99.7	-	99.7	99.8	-	-	99.7
Middlesbrough	Affiliate	91.9	99.8	99.6	99.9	-	99.8	98.2
Newcastle Centre	DEFRA	**97.3**	**97.2**	**20.4**	**97.4**	-	**97.1**	**81.9**
Northampton	Affiliate	**99.7**	**96.9**	**99.7**	**98.9**	-	**99.7**	**99.0**
Northampton PM10	Affiliate	-	**90.2**	-	-	-	-	**90.2**
Norwich Centre	DEFRA	98.1	89.9	**97.6**	**98.0**	-	98.2	**96.4**
Norwich Forum Roadside	Affiliate	-	-	85.3	-	-	-	85.3
Nottingham Centre	DEFRA	**99.4**	**98.9**	**99.3**	**99.5**	-	**99.5**	**99.3**

Site	Owner	CO	PM_{10}	NO_2	O3	PM_{25}	SO_2	Site Average
Oxford Centre Roadside	Affiliate	**90.4**	-	90.4	-	-	**90.4**	**90.4**
Plymouth Centre	DEFRA	0.0	**0.0**	0.0	0.0	-	0.0	**0.0**
Portsmouth	Affiliate	**99.7**	**99.2**	**99.8**	**99.5**	-	**99.9**	**99.6**
Preston	DEFRA	**90.4**	**99.5**	**94.8**	**98.9**	-	**95.8**	**95.9**
Reading New Town	DEFRA	**97.5**	**96.8**	**72.2**	**97.7**	-	**97.3**	**92.3**
Redcar	Affiliate	58.2	81.4	56.1	80.1	-	63.9	67.9
Rochester	Affiliate	-	95.5	98.1	98.2	98.3	98.1	97.6
Rotherham Centre	Affiliate	-	-	99.5	96.5	-	79.0	91.7
Salford Eccles	Affiliate	89.6	97.5	98.7	98.7	-	60.7	89.0
Sandwell West Bromwich	Affiliate	89.8	-	36.9	99.2	-	93.7	79.9
Scunthorpe Town	Affiliate	-	**93.3**	-	-	-	98.1	**95.7**
Sheffield Centre	DEFRA	95.7	**99.3**	94.9	95.7	-	95.6	**96.2**
Sheffield Tinsley	DEFRA	98.7	-	98.6	-	-	-	98.7
Sibton	DEFRA	-	-	-	**70.4**	-	-	**70.4**
Somerton	Affiliate	-	-	**99.5**	**99.5**	-	-	**99.5**
Southampton Centre	DEFRA	**60.6**	**74.7**	**95.3**	**99.6**	-	**75.4**	**81.1**
Southend-on-Sea	DEFRA	**99.1**	**99.4**	**99.2**	**99.0**	-	**99.3**	**99.2**
Southwark Roadside	Affiliate	0.0	-	0.0	-	-	0.0	0.0
St Osyth	DEFRA	99.5	-	**99.6**	**99.5**	-	-	**99.5**
Stockport Shaw Heath	Affiliate	99.8	100.0	47.1	-	-	99.8	86.7
Stockton-on-Tees Yarm	Affiliate	**89.0**	**95.1**	**98.5**	-	-	-	**94.2**
Stoke-on-Trent Centre	DEFRA	**94.3**	**98.8**	**98.5**	**94.6**	-	**94.7**	**96.2**
Sunderland	DEFRA	-	-	-	-	-	**96.9**	**96.9**
Sunderland Silksworth	Affiliate	-	-	**74.5**	**93.4**	-	-	**83.9**
Thurrock	Affiliate	99.6	99.7	**91.6**	**99.0**	-	99.5	**97.9**
Tower Hamlets Roadside	Affiliate	85.4	-	99.8	-	-	-	92.6
Walsall Alumwell	DEFRA	-	-	100.0	-	-	-	100.0
Walsall Willenhall	Affiliate	-	-	99.7	-	-	-	99.7
West London	DEFRA	92.7	-	91.8	-	-	-	92.3
Weybourne	Affiliate	-	-	-	100.0	-	-	100.0
Wicken Fen	DEFRA	-	-	**98.3**	**94.5**	-	97.0	**96.6**
Wigan Centre	Affiliate	**99.5**	**99.3**	**99.6**	**99.4**	-	**99.3**	**99.4**
Wirral Tranmere	DEFRA	**99.4**	**99.3**	**99.5**	**99.4**	-	**69.7**	**93.5**
W'hampton Centre	DEFRA	97.8	99.5	91.7	99.5	-	99.5	97.6
Yarner Wood	DEFRA	-	-	**87.6**	**91.8**	-	-	**89.7**
N Ireland								

Site	Owner	CO	PM_{10}	NO_2	O3	PM_{25}	SO_2	Site Average
Belfast Centre	DEFRA	**88.0**	97.7	**93.5**	**88.2**	-	98.4	**93.2**
Belfast Clara St	Affiliate	-	99.0	-	-	-	-	99.0
Belfast East	DEFRA	-	-	-	-	-	88.9	88.9
Derry	Affiliate	**98.2**	**98.1**	**97.9**	**90.2**	-	**98.1**	**96.5**
Lough Navar	DEFRA	-	99.8	-	**99.9**	-	-	**99.8**
Scotland								
Aberdeen	Affiliate	**100.0**	**99.9**	**98.3**	**100.0**	-	**99.8**	**99.6**
Auchencorth Moss	DEFRA	-	91.3	-	93.4	-	-	92.4
Bush Estate	DEFRA	-	-	**98.6**	**98.6**	-	-	**98.6**
Dumfries	DEFRA	**50.3**	**100.0**	**98.4**	-	-	-	**82.9**
Edinburgh St Leonards	DEFRA	**99.6**	**97.4**	**96.5**	**99.5**	-	**99.6**	**98.5**
Eskdalemuir	DEFRA	-	-	**89.9**	**99.7**	-	-	**94.8**
Fort William	DEFRA	-	-	**93.9**	**77.1**	-	-	**85.5**
Glasgow Centre	DEFRA	90.8	99.0	**90.8**	**99.6**	-	**84.2**	**92.9**
Glasgow City Chambers	DEFRA	99.5	-	99.2	-	-	-	99.3
Glasgow Kerbside	DEFRA	99.0	89.5	99.0	-	-	-	95.8
Grangemouth	Affiliate	**95.9**	**98.5**	**98.6**	-	-	**98.6**	**97.9**
Inverness	DEFRA	99.7	**94.6**	**99.6**	-	-	-	**98.0**
Lerwick	DEFRA	-	-	-	96.5	-	-	96.5
Strath Vaich	DEFRA	-	-	-	**44.6**	-	-	**44.6**
Wales								
Aston Hill	DEFRA	-	-	**75.0**	**93.6**	-	-	**84.3**
Cardiff Centre	DEFRA	**97.0**	**97.2**	**99.7**	**99.8**	-	**99.4**	**98.6**
Cwmbran	Affiliate	**99.9**	**98.6**	**100.0**	**100.0**	-	**100.0**	**99.7**
Narberth	Affiliate	-	90.1	90.9	**90.7**	-	90.3	**90.5**
Port Talbot	Affiliate	-	89.0	99.2	99.3	-	99.0	96.6
Swansea Roadside	Affiliate	**99.4**	85.2	98.3	99.6	58.7	99.5	**90.1**
Wrexham	DEFRA	**89.3**	**95.7**	**95.2**	-	-	**93.4**	**93.4**
Number of sites		78	72	111	90	5	76	127
Number of sites < 90%		18	8	18	9	1	15	28
Network Mean (%)		90.0	95.0	90.1	93.8	90.9	91.8	90.3

Shaded boxes are for data capture < 90%
Bold data captures are for critical instruments and sites

Table 5.2 shows the ratified data capture statistics for each site for the 12-month period January-December 2006

Table 5.2 Ratified Network data Capture Statistics : January to December 2006

Network Data Capture for 01/01/2006 to 31/12/2006 from start date of any new site

Site	Owner	CO	PM_{10}	NO_2	O_3	PM_{25}	SO_2	Site Average
England								
Barnsley 12	DEFRA	-	-	-	-	-	89.5	89.5
Barnsley Gawber	Affiliate	**77.9**	-	**77.0**	**93.3**	-	93.0	**85.3**
Bath Roadside	Affiliate	83.2	-	98.2	-	-	-	90.7
Billingham	DEFRA	-	-	97.8	-	-	-	97.8
Birmingham Centre	DEFRA	95.5	97.4	93.9	95.6	-	96.8	95.8
Birmingham Tyburn	Affiliate	98.7	94.7	87.1	98.7	-	98.6	95.6
Blackpool Marton	DEFRA	**93.5**	**95.5**	**94.5**	**95.2**	-	**87.1**	**93.1**
Bolton	Affiliate	97.4	97.0	67.5	97.3	-	86.1	89.1
Bottesford	Affiliate	-	-	-	98.8	-	-	98.8
Bournemouth	Affiliate	**97.2**	**98.9**	**93.1**	**98.7**	-	**98.6**	**97.3**
Bradford Centre	DEFRA	94.2	94.5	94.0	92.7	-	90.7	93.2
Brentford Roadside	Affiliate	65.3	-	86.5	-	-	-	75.9
Brighton Preston Park	DEFRA	-	-	**98.2**	**96.3**	-	-	**97.3**
Brighton Roadside	Affiliate	98.0	-	99.1	-	-	-	98.6
Brighton Roadside PM_{10}	Affiliate	-	**97.0**	-	-	-	-	**97.0**
Bristol Old Market	Affiliate	97.3	-	99.0	-	-	-	98.2
Bristol St Paul's	DEFRA	97.0	96.7	97.6	98.4	-	98.2	97.6
Bury Roadside	Affiliate	44.5	86.6	81.2	85.1	-	81.6	75.8
Cambridge Roadside	Affiliate	-	-	89.7	-	-	-	89.7
Camden Kerbside	Affiliate	-	86.0	96.9	-	-	-	91.5
Canterbury	Affiliate	-	**99.0**	97.5	-	-	-	**98.2**
Coventry Memorial Park	DEFRA	**99.2**	**99.2**	**99.3**	**98.9**	-	**95.3**	**98.4**
Exeter Roadside	Affiliate	98.7	-	97.3	97.0	-	91.0	96.0
Glazebury	DEFRA	-	-	**96.6**	**73.9**	-	-	**85.3**
Great Dun Fell	DEFRA	-	-	-	**99.0**	-	-	**99.0**
Haringey Roadside	Affiliate	-	86.5	85.1	-	-	-	85.8
Harwell	DEFRA	-	98.0	92.6	93.6	97.9	96.3	95.7
High Muffles	DEFRA	-	-	**87.7**	**89.5**	-	-	**88.6**
Hove Roadside	Affiliate	99.3	-	88.5	-	-	**99.3**	**95.7**
Hull Freetown	DEFRA	**64.9**	**97.6**	**86.7**	**97.7**	-	**97.6**	**88.9**
Ladybower	DEFRA	-	-	46.4	94.9	-	93.4	78.3
Leamington Spa	Affiliate	**98.7**	**98.7**	**72.8**	**98.4**	-	**87.0**	**91.1**
Leeds Centre	DEFRA	94.0	99.1	91.5	99.2	-	99.2	96.6
Leicester Centre	DEFRA	**98.5**	**98.3**	**98.4**	**98.6**	-	**98.6**	**98.5**
Leominster	DEFRA	-	-	**91.7**	**96.4**	-	-	**94.1**
Liverpool Speke	DEFRA	**94.2**	**96.0**	**92.0**	**97.2**	-	**92.6**	**94.4**
London A3 Roadside	DEFRA	97.6	98.5	97.8	-	-	-	97.9
London Bexley	Affiliate	97.3	91.0	92.4	94.5	-	96.9	94.4
London Bloomsbury	DEFRA	95.3	98.0	93.3	96.1	97.6	94.6	95.8
London Brent	Affiliate	98.8	99.0	98.2	98.8	-	94.6	97.9
London Bromley	Affiliate	-	-	59.9	-	-	-	59.9
London Cromwell Road 2	DEFRA	95.0	-	90.8	-	-	88.7	91.5
London Eltham	Affiliate	-	96.9	99.0	97.3	-	97.4	97.6
London Hackney	Affiliate	91.7	-	83.4	24.5	-	-	66.6
London Haringey	Affiliate	-	-	-	71.8	-	-	71.8

Site	Owner	CO	PM_{10}	NO_2	O_3	PM_{25}	SO_2	Site Average
London Harlington	Affiliate	99.0	98.8	98.3	91.5	-	-	96.9
London Hillingdon	DEFRA	95.9	96.9	94.3	98.0	-	98.0	96.6
London Lewisham	Affiliate	-	-	92.0	99.6	-	97.8	96.4
London Marylebone Road	Affiliate	66.4	97.1	97.2	95.7	97.8	91.3	90.9
London N. Kensington	Affiliate	96.6	99.1	99.2	94.8	-	98.8	97.7
London Southwark	Affiliate	68.8	-	86.1	39.9	-	75.6	67.6
London Teddington	Affiliate	-	-	98.6	98.9	-	98.5	98.7
London Wandsworth	Affiliate	-	-	97.8	99.3	-	-	98.6
London Westminster	DEFRA	41.4	95.6	96.0	97.2	-	88.6	83.8
Lullington Heath	DEFRA	-	-	85.7	89.1	-	82.1	85.6
Manchester Piccadilly	DEFRA	95.0	96.3	97.4	90.7	-	95.8	95.0
Manchester South	Affiliate	-	-	88.1	98.1	-	96.9	94.4
Manchester Town Hall	DEFRA	39.2	-	86.9	-	-	-	63.1
Market Harborough	DEFRA	98.3	-	95.8	95.3	-	-	96.5
Middlesbrough	Affiliate	92.2	98.1	96.3	97.6	-	98.2	96.5
Newcastle Centre	DEFRA	**98.2**	**97.9**	**62.9**	**98.2**	-	**98.2**	**91.1**
Northampton	Affiliate	**99.3**	**95.8**	**98.4**	**97.1**	-	**98.7**	**97.9**
Northampton PM_{10}	Affiliate	-	**91.5**	-	-	-	-	**91.5**
Norwich Centre	DEFRA	99.2	65.5	**99.1**	**99.2**	-	99.3	**92.5**
Norwich Forum Roadside	Affiliate	-	-	88.8	-	-	-	88.8
Nottingham Centre	DEFRA	**98.2**	**98.2**	**98.1**	**98.2**	-	**95.2**	**97.6**
Oxford Centre Roadside	Affiliate	**96.5**	-	95.2	-	-	**96.5**	**96.1**
Plymouth Centre	DEFRA	55.6	**44.9**	44.5	13.7	-	52.9	**42.3**
Portsmouth	Affiliate	**99.0**	**98.5**	**99.1**	**99.0**	-	**98.2**	**98.8**
Preston	DEFRA	**95.0**	**98.0**	**90.3**	**95.4**	-	**97.1**	**95.2**
Reading New Town	DEFRA	**96.0**	**93.9**	**71.2**	**94.4**	-	**94.3**	**90.0**
Redcar	Affiliate	85.3	86.9	83.7	89.4	-	83.8	85.8
Rochester	Affiliate	-	92.3	92.9	98.6	98.3	96.6	95.7
Rotherham Centre	Affiliate	-	-	77.8	90.9	-	40.6	69.8
Salford Eccles	Affiliate	87.3	95.9	96.5	94.4	-	88.0	92.4
Sandwell West Bromwich	Affiliate	95.5	-	69.4	98.0	-	96.5	89.9
Scunthorpe Town	Affiliate	-	**96.1**	-	-	-	94.1	**95.1**
Sheffield Centre	DEFRA	97.0	**97.2**	52.5	96.9	-	92.9	**87.3**
Sheffield Tinsley	DEFRA	92.8	-	98.6	-	-	-	95.7
Sibton	DEFRA	-	-	-	**92.0**	-	-	**92.0**
Somerton	Affiliate	-	-	**80.5**	**92.2**	-	-	**86.3**
Southampton Centre	DEFRA	**70.0**	**89.2**	**90.0**	**94.7**	-	**74.0**	**83.6**
Southend-on-Sea	DEFRA	**98.9**	**96.6**	**97.7**	**98.9**	-	**98.9**	**98.2**
Southwark Roadside	Affiliate	10.7	-	14.0	-	-	10.4	11.7
St Osyth	DEFRA	92.2	-	**95.0**	**98.0**	-	-	**95.1**
Stockport Shaw Heath	Affiliate	99.0	98.9	83.2	-	-	99.0	95.0
Stockton-on-Tees Yarm	Affiliate	**95.8**	**98.0**	**98.9**	-	-	-	**97.6**
Stoke-on-Trent Centre	DEFRA	**93.9**	**96.4**	**93.4**	**93.2**	-	**94.7**	**94.3**
Sunderland	DEFRA	-	-	-	-	-	**97.2**	**97.2**

Site	Owner	CO	PM_{10}	NO_2	O_3	PM_{25}	SO_2	Site Average
Sunderland Silksworth	Affiliate	-	-	**91.2**	**93.7**	-	-	**92.5**
Thurrock	Affiliate	98.2	98.2	**92.7**	**98.2**	-	98.2	**97.1**
Tower Hamlets Roadside	Affiliate	88.1	-	99.5	-	-	-	93.8
Walsall Alumwell	DEFRA	-	-	98.0	-	-	-	98.0
Walsall Willenhall	Affiliate	-	-	89.3	-	-	-	89.3
West London	DEFRA	84.1	-	94.5	-	-	-	89.3
Weybourne	Affiliate	-	-	-	88.9	-	-	88.9
Wicken Fen	DEFRA	-	-	**97.3**	**86.4**	-	92.1	**91.9**
Wigan Centre	Affiliate	**96.5**	**94.9**	**97.4**	**96.3**	-	**94.0**	**95.8**
Wirral Tranmere	DEFRA	**95.8**	**94.3**	**93.5**	**91.6**	-	**76.5**	**90.3**
Wolverhampton Centre	DEFRA	93.2	97.9	94.6	97.8	-	97.8	96.3
Yarner Wood	DEFRA	-	-	**87.8**	**96.4**	-	-	**92.1**
N Ireland								
Belfast Centre	DEFRA	**82.4**	94.6	**90.7**	**92.3**	-	94.1	**90.8**
Belfast Clara St	Affiliate	-	99.2	-	-	-	-	99.2
Belfast East	DEFRA	-	-	-	-	-	96.3	96.3
Derry	Affiliate	**95.3**	**96.8**	**88.1**	**79.6**	-	**92.7**	**90.5**
Lough Navar	DEFRA	-	98.6	-	**98.8**	-	-	**98.7**
Scotland								
Aberdeen	Affiliate	**99.1**	**94.9**	**96.7**	**99.0**	-	**98.8**	**97.7**
Auchencorth Moss	DEFRA	-	88.8	-	93.4	-	-	91.1
Bush Estate	DEFRA	-	-	**86.8**	**97.9**	-	-	**92.4**
Dumfries	DEFRA	**84.6**	**88.5**	**94.3**	-	-	-	**89.1**
Edinburgh St Leonards	DEFRA	**97.2**	**98.2**	**93.8**	**98.5**	-	**98.7**	**97.3**
Eskdalemuir	DEFRA	-	-	**89.1**	**98.8**	-	-	**94.0**
Fort William	DEFRA	-	-	**80.6**	**83.3**	-	-	**81.9**
Glasgow Centre	DEFRA	88.7	93.0	**96.1**	**98.4**	-	**90.1**	**93.3**
Glasgow City Chambers	DEFRA	98.9	-	98.2	-	-	-	98.6
Glasgow Kerbside	DEFRA	95.8	84.9	92.5	-	-	-	91.1
Grangemouth	Affiliate	**95.7**	**96.9**	**98.0**	-	-	**98.1**	**97.2**
Inverness	DEFRA	99.2	**91.0**	**99.0**	-	-	-	**96.4**
Lerwick	DEFRA	-	-	-	95.9	-	-	95.9
Strath Vaich	DEFRA	-	-	-	**83.6**	-	-	**83.6**
Wales								
Aston Hill	DEFRA	-	-	**69.5**	**92.4**	-	-	**80.9**
Cardiff Centre	DEFRA	**97.8**	**94.9**	**97.1**	**98.2**	-	**95.8**	**96.8**
Cwmbran	Affiliate	**99.3**	**98.3**	**95.5**	**99.5**	-	**71.3**	**92.8**
Narberth	Affiliate	-	90.3	94.0	**91.6**	-	81.5	**89.3**
Port Talbot	Affiliate	-	90.0	97.2	98.2	-	96.8	95.6
Swansea	Affiliate	**86.3**	93.3	90.8	93.1	-	86.1	**89.9**
Swansea Roadside	Affiliate	**98.9**	77.3	97.9	99.2	53.8	99.0	**87.7**
Wrexham	DEFRA	**95.5**	**95.3**	**94.4**	-	-	**92.4**	**94.4**
Number of sites		79	73	112	91	5	77	128
Number of sites < 90%		20	11	36	14	1	19	38
Network Mean (%)		89.6	94.0	89.7	92.6	89.1	91.1	90.8

Shaded boxes are for data capture < 90%
Bold data captures are for critical instruments and sites

Table 5.3 shows the ratified AURN data capture for the 62 operational **critical sites** in the network for the 12-month period January to December 2006. Sites with less than 90% data capture are shaded. This table contains the overall data capture for 12 months, regardless of when sites started or finished monitoring. A total of 15 critical sites had a data capture of less than 90%.

Table 5.3 AURN Ratified Data Capture (%) for Critical Sites January to December 2006

Site	Owner	CO	PM_{10}	NO_2	O_3	PM_{25}	SO_2	Site Average
England								
Barnsley Gawber	Affiliate	**77.9**	-	**77.0**	**93.3**	-	93.0	**85.3**
Blackpool Marton	DEFRA	**93.5**	**95.5**	**94.5**	**95.2**	-	**87.1**	**93.1**
Bournemouth	Affiliate	**97.2**	**98.9**	**93.1**	**98.7**	-	**98.6**	**97.3**
Brighton Preston Park	DEFRA	-	-	**98.2**	**96.3**	-	-	**97.3**
Brighton Roadside PM_{10}	Affiliate	-	**97.0**	-	-	-	-	**97.0**
Canterbury	Affiliate	-	**99.0**	97.5	-	-	-	**98.2**
Coventry Memorial Park	DEFRA	**99.2**	**99.2**	**99.3**	**98.9**	-	**95.3**	**98.4**
Glazebury	DEFRA	-	-	**96.6**	**73.9**	-	-	**85.3**
Great Dun Fell	DEFRA	-	-	-	**99.0**	-	-	**99.0**
High Muffles	DEFRA	-	-	**87.7**	**89.5**	-	-	**88.6**
Hove Roadside	Affiliate	99.3	-	88.5	-	-	**99.3**	**95.7**
Hull Freetown	DEFRA	**64.9**	**97.6**	**86.7**	**97.7**	-	**97.6**	**88.9**
Leamington Spa	Affiliate	**98.7**	**98.7**	**72.8**	**98.4**	-	**87.0**	**91.1**
Leicester Centre	DEFRA	**98.5**	**98.3**	**98.4**	**98.6**	-	**98.6**	**98.5**
Leominster	DEFRA	-	-	**91.7**	**96.4**	-	-	**94.1**
Liverpool Speke	DEFRA	**94.2**	**96.0**	**92.0**	**97.2**	-	**92.6**	**94.4**
Newcastle Centre	DEFRA	**98.2**	**97.9**	**62.9**	**98.2**	-	**98.2**	**91.1**
Northampton	Affiliate	**99.3**	**95.8**	**98.4**	**97.1**	-	**98.7**	**97.9**
Northampton PM_{10}	Affiliate	-	**91.5**	-	-	-	-	**91.5**
Norwich Centre	DEFRA	99.2	65.5	**99.1**	**99.2**	-	99.3	**92.5**
Nottingham Centre	DEFRA	**98.2**	**98.2**	**98.1**	**98.2**	-	**95.2**	**97.6**
Oxford Centre Roadside	Affiliate	**96.5**	-	95.2	-	-	**96.5**	**96.1**
Plymouth Centre	DEFRA	55.6	**44.9**	44.5	13.7	-	52.9	**42.3**
Portsmouth	Affiliate	**99.0**	**98.5**	**99.1**	**99.0**	-	**98.2**	**98.8**
Preston	DEFRA	**95.0**	**98.0**	**90.3**	**95.4**	-	**97.1**	**95.2**
Scunthorpe Town	Affiliate	-	**96.1**	-	-	-	94.1	**95.1**
Sheffield Centre	DEFRA	97.0	**97.2**	52.5	96.9	-	92.9	**87.3**
Sibton	DEFRA	-	-	-	**92.0**	-	-	**92.0**
Somerton	Affiliate	-	-	**80.5**	**92.2**	-	-	**86.3**
Southampton Centre	DEFRA	**70.0**	**89.2**	**90.0**	**94.7**	-	**74.0**	**83.6**
Southend-on-Sea	DEFRA	**98.9**	**96.6**	**97.7**	**98.9**	-	**98.9**	**98.2**

St Osyth	DEFRA	92.2	-	**95.0**	**98.0**	-	-	**95.1**
Stockton-on-Tees Yarm	Affiliate	**95.8**	**98.0**	**98.9**	-	-	-	**97.6**
Stoke-on-Trent Centre	DEFRA	**93.9**	**96.4**	**93.4**	**93.2**	-	**94.7**	**94.3**
Sunderland	DEFRA	-	-	-	-	-	**97.2**	**97.2**
Sunderland Silksworth	Affiliate	-	-	**91.2**	**93.7**	-	-	**92.5**
Thurrock	Affiliate	98.2	98.2	**92.7**	**98.2**	-	98.2	**97.1**
Wicken Fen	DEFRA	-	-	**97.3**	**86.4**	-	92.1	**91.9**
Wigan Centre	Affiliate	**96.5**	**94.9**	**97.4**	**96.3**	-	**94.0**	**95.8**
Wirral Tranmere	DEFRA	**95.8**	**94.3**	**93.5**	**91.6**	-	**76.5**	**90.3**
Yarner Wood	DEFRA	-	-	**87.8**	**96.4**	-	-	**92.1**
N Ireland								
Belfast Centre	DEFRA	**82.4**	94.6	**90.7**	**92.3**	-	94.1	**90.8**
Derry	Affiliate	**95.3**	**96.8**	**88.1**	**79.6**	-	**92.7**	**90.5**
Lough Navar	DEFRA	-	98.6	-	**98.8**	-	-	**98.7**
Scotland								
Aberdeen	Affiliate	**99.1**	**94.9**	**96.7**	**99.0**	-	**98.8**	**97.7**
Bush Estate	DEFRA	-	-	**86.8**	**97.9**	-	-	**92.4**
Dumfries	DEFRA	**84.6**	**88.5**	**94.3**	-	-	-	**89.1**
Edinburgh St Leonards	DEFRA	**97.2**	**98.2**	**93.8**	**98.5**	-	**98.7**	**97.3**
Eskdalemuir	DEFRA	-	-	**89.1**	**98.8**	-	-	**94.0**
Fort William	DEFRA	-	-	**80.6**	**83.3**	-	-	**81.9**
Glasgow Centre	DEFRA	88.7	93.0	**96.1**	**98.4**	-	**90.1**	**93.3**
Grangemouth	Affiliate	**95.7**	**96.9**	**98.0**	-	-	**98.1**	**97.2**
Inverness	DEFRA	99.2	**91.0**	**99.0**	-	-	-	**96.4**
Strath Vaich	DEFRA	-	-	-	**83.6**	-	-	**83.6**
Wales								
Aston Hill	DEFRA	-	-	**69.5**	**92.4**	-	-	**80.9**
Cardiff Centre	DEFRA	**97.8**	**94.9**	**97.1**	**98.2**	-	**95.8**	**96.8**
Cwmbran	Affiliate	**99.3**	**98.3**	**95.5**	**99.5**	-	**71.3**	**92.8**
Narberth	Affiliate	-	90.3	94.0	**91.6**	-	81.5	**89.3**
Swansea	Affiliate	**86.3**	93.3	90.8	93.1	-	86.1	**89.9**
Swansea Roadside	Affiliate	**98.9**	77.3	97.9	99.2	53.8	99.0	**87.7**
Wrexham	DEFRA	**95.5**	**95.3**	**94.4**	-	-	**92.4**	**94.4**

RECOMMENDATION
Every effort should be made to ensure that data capture is maximised for the critical sites. LSOs and ESUs should undertake call-outs and repairs as soon as possible to avoid unnecessary data loss at these sites.

PART B – Annual Review for 2006

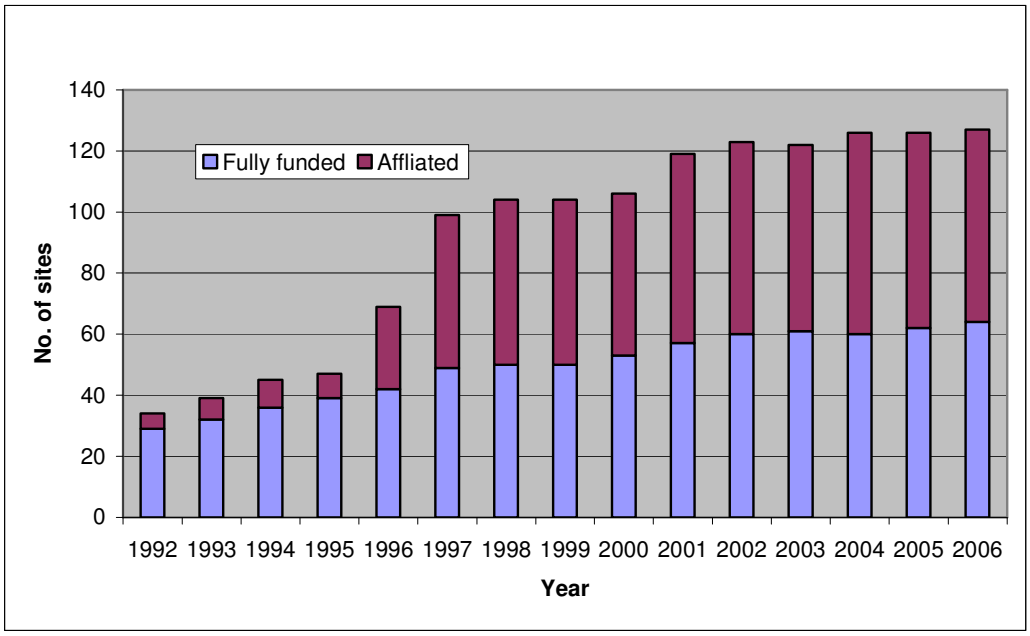
6 Overview of Network Performance

This section provides an overview of network performance during 2006. More details are given in the individual reports for each quarter-see Section 7.

6.1 Network Expansion

The number of sites in the network continues to grow, albeit more slowly than recent years. The total number of sites operational at the end of 2006 was 128. Of these, 65 are fully funded sites, and 63 are affiliated, mainly from local authorities. This is shown in Figure 6.1.

Figure 6.1 Site Numbers in the AURN



7 Review of QA/QC Unit Activities

7.1 QA/QC Reports

The QA/QC Unit has produced detailed quarterly reports giving an overview of network performance, reasons for data losses and data capture statistics.

Recommendations for equipment and site upgrades and replacements have also been made. A list of the reports for 2006 is given in Table 7.1.

Table 7.1 QA/QC data Ratification and Intercalibration Reports, 2006

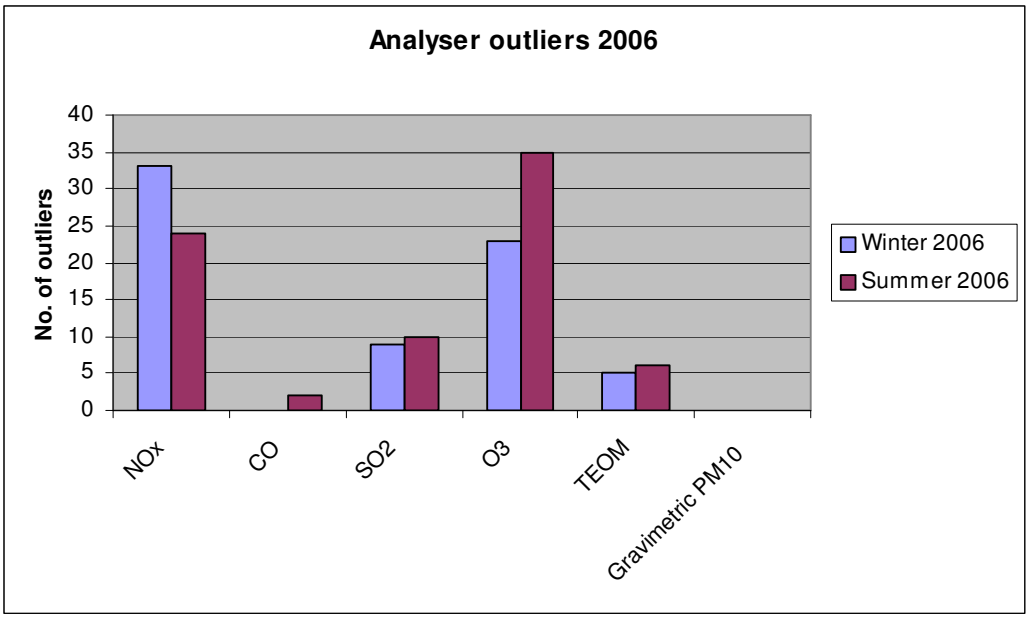
	Type	Report Title	Reference
1	Ratification and Intercalibration	QA/QC Data Ratification and Intercalibration Report for the Automatic Urban and Rural Network, January-March 2006	AEAT/ENV/R/2262
2	Ratification	QA/QC Data Ratification Report for the Automatic Urban and Rural Network, April-June 2006	AEAT/ENV/R/2326
3	Ratification and Intercalibration	QA/QC Data Ratification and Intercalibration Report for the Automatic Urban and Rural Network July-September 2006	AEAT/ENV/R/2375
4	Ratification and Annual Review	QA/QC Data Ratification and Annual Report for the Automatic Urban and Rural Network October-December 2006	AEAT/ENV/R/2428

All reports are available on the Air Quality Information Archive (www.airquality.co.uk) and on the AURN Hub.

7.2 Network Intercalibrations

Two complete network intercomparisons were carried out at 6-monthly intervals during 2006. These are an important part of the overall QA/QC programme for the AURN network. The purpose of these intercomparisons is to determine the network measurement accuracy, consistency and intercomparability across the entire network. The latest exercise covered all 128 sites (except Southwark Roadside, which has been closed, and those closed for relocation/refurbishment at the time). The procedures used, and a summary of the results obtained, are provided in the January-March and July-September QA/QC reports.
A summary of the number of analysers in the network found to be providing provisional data outwith the defined accuracy limits (the “outlier” sites)is given in Figure 7.1. A full definition of what constitutes an outlier site for the different pollutants is given in the appropriate Quarterly Reports (see Table 7.1). Note also that, for the vast majority of these outlier sites, the data will have been fully corrected as part of the subsequent data ratification process.

Figure 7.1 Outliers identified during 2006 intercalibration exercises.



Sites which have been commissioned, recommissioned in new locations or have had new analysers iinstalled have been audited by the QA/QC Unit prior to the publication of the data from the site.

The intercalibration visits are also used to ensure information about network sites and analysers are correct and up to date-see Appendix B1. For example, at recent network intercalibration exercises, information has been gathered on the sample manifold systems used at all sites, the detailed set-up parameters for the TEOM particle analysers, and how site locations compare to the requirements listed in the EC Directives.

7.3 ESU, CMCU, LSO and QA/QC Meetings

During 2006, the QA/QC Unit also arranged a series of meetings with the ESUs from the defra/DA funded sites. These were held to discuss specific data quality issues, and to highlight changes in ESU procedures that may result from the adoption of CEN standards-see Section 8. The QA/QC Unit have provided the ESUs with spreadsheets to calculate various analyser performance parameters (eg converter efficiency, linearity) in line with the CEN requirements; ESUs have been requested to integrate the principles into their routine site tests.

All parties were in agreement that work undertaken by the ESUs is a vitally important part of the overall data quality management process for the network, and it is planned to repeat the meetings at regular intervals.

The QA/QC Unit has attended the AURN LSO meetings, and presented network updates as appropriate. These presentations are available on the AURN Hub.

7.4 International Intercomparisons

The QA/QC Unit attended an EC intercomparison at Langen, in May 2006. The pollutants measured were NO, NO_2, SO_2 and CO. The final results show excellent agreement with the host laboratory standards, and provide confidence that the AURN meets the data quality objectives.

7.5 TEOM Upgrades to FDMS

The first FDMS analysers in the network were installed during 2006 at Swansea Roadside. This site has FDMS analysers for both PM_{10} and $PM_{2.5}$. These were audited by the QA/QC Unit in October 2006. A new section of the LSO Manual has been written and is available on the AURN hub.

A brief description of data ratification procedures for FDMS analysers is given in Section 2.4

7.6 Network Data Capture

The overall network data capture for 2006 was 90.8%, which is above the 90% target level. However, inevitably, not all sites achieved >90% and a table of data capture for the 28 sites with less than 90% capture is given in Table 7.1.

Table 7.1 Sites with Annual Average Data Capture Below 90%for 2006

Site	Owner	Site Average
England		
Barnsley 12	DEFRA	89.5
Barnsley Gawber	Affiliate	85.3
Bolton	Affiliate	89.1
Brentford Roadside	Affiliate	75.9
Bury Roadside	Affiliate	75.8
Cambridge Roadside	Affiliate	89.7
Glazebury	DEFRA	85.3
Haringey Roadside	Affiliate	85.8
High Muffles	DEFRA	88.6
Hull Freetown	DEFRA	88.9
Ladybower	DEFRA	78.3
London Bromley	Affiliate	59.9
London Hackney	Affiliate	66.6
London Haringey	Affiliate	71.8
London Southwark	Affiliate	67.6
London Westminster	DEFRA	83.8
Lullington Heath	DEFRA	85.6
Manchester Town Hall	DEFRA	63.1
Norwich Forum Roadside	Affiliate	88.8
Plymouth Centre	DEFRA	42.3
Redcar	Affiliate	85.8
Rotherham Centre	Affiliate	69.8
Sandwell West Bromwich	Affiliate	89.9
Sheffield Centre	DEFRA	87.3
Somerton	Affiliate	86.3
Southampton Centre	DEFRA	83.6
Southwark Roadside	Affiliate	11.7
Walsall Willenhall	Affiliate	89.3

West London	DEFRA	89.3
Weybourne	Affiliate	88.9
N Ireland		
Scotland		
Dumfries	DEFRA	89.1
Fort William	DEFRA	81.9
Strath Vaich	DEFRA	83.6
Wales		
Aston Hill	DEFRA	80.9
Narberth	Affiliate	89.3
Swansea	Affiliate	89.9
Swansea Roadside	Affiliate	87.7
Number of sites < 90%		38

A summary of data capture by pollutant for the year 2006 is given in Table 7.2

Table 7.2 Summary of data capture by pollutant, 2006

	CO	NO_2	O_3	PM_{10}	$PM_{2.5}$	SO_2
Number of sites	79	73	112	91	5	77
Number of sites < 90%	20	11	36	14	1	19
Network Mean (%)	89.6	94.0	89.7	92.6	89.1	91.1

In terms of reporting air quality data to the European Commission for compliance with European Air Quality Directives, it is important to identify the data capture from the critical sites to see where there may be insufficient data capture for a particular UK zone or agglomeration. Overall, there were 34 critical site analysers in 23 agglomerations/zones with annual average data capture below 90%. These are grouped by pollutant as follows:

5 CO analysers:

- Barnsley Gawber
- Hull Freetown
- Southampton Centre
- Dumfries
- Swansea

13 NO_2 analysers

- Barnsley Gawber
- High Muffles
- Hull Freetown
- Leamington Spa
- Newcastle Centre
- Reading New Town
- Somerton
- Yarner Wood
- Derry
- Bush Estate
- Eskdalemuir
- Fort William
- Aston Hill

5 O_3 analysers
- Glazebury
- High Muffles
- Wicken Fen
- Derry
- Strath Vaich

3 PM_{10} analysers
- Plymouth Centre
- Southampton Centre
- Dumfries

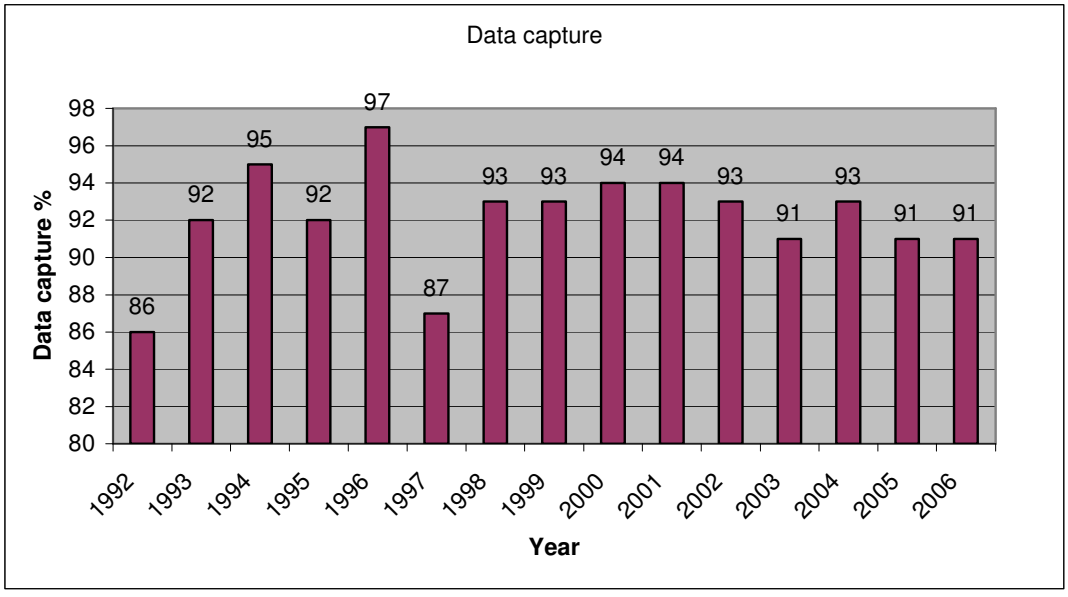
- 5 SO_2 analysers
- Southampton Centre
- Blackpool Marton
- Leamington Spa
- Wirral Tranmere
- Cwmbran

(There are other non-critical analysers at critical sites with data capture below 90%)

For these sites, pollution statistics calculated for analysers with data capture above 75% or modelled data have to be used. However, neither of these approaches is entirely satisfactory. Hence, the QA/QC unit continues to make the recommendation that greater attention needs to be paid to minimising data loss from the critical sites.

The network annual average data capture of 90.8% is almost identical to the previous year. During 2006, there were 34 critical site analysers with less than 90% data capture. The network is clearly operating in a steady-state level of operation, despite some ageing analysers and sites closed, sometimes for extended periods, for relocation or refurbishment. Figure 7.1 shows the annual network data capture since the start of the AURN in 1992.

Figure 7.1 Annual Average Data Capture 1992-2006



7.7 Investigation of Spurious Data

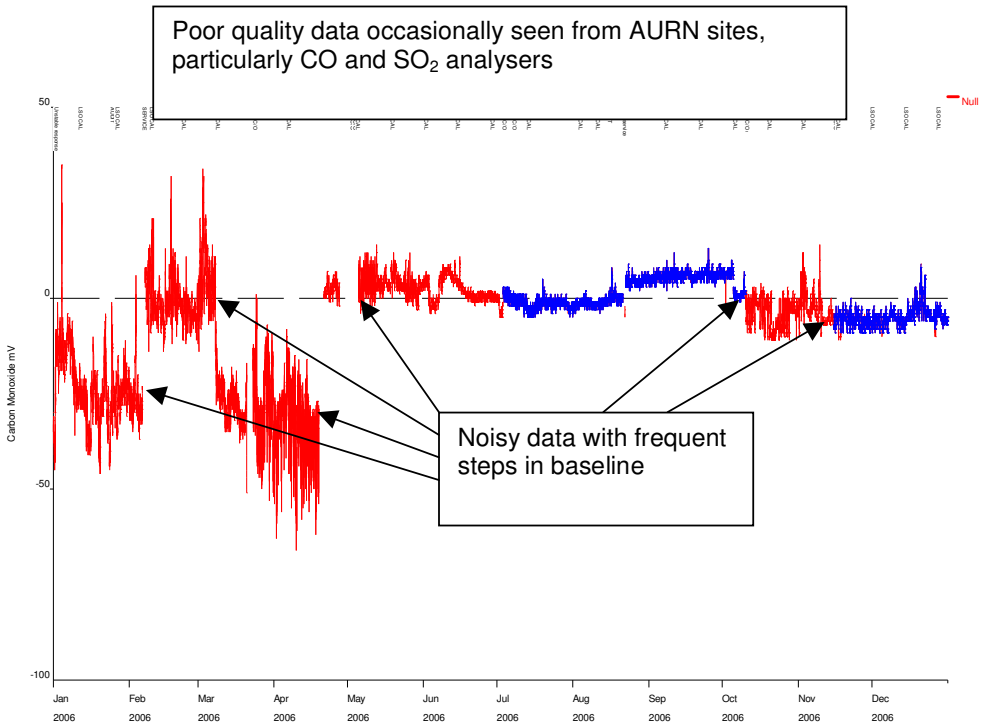
The data ratification process involves checking many millions of 15-minute average concentrations every year. Although the majority of analysers operate satisfactorily, there are inevitably some problems that require more detailed investigation by the QA/QC unit during the ratification process. The QA/QC Unit works closely with the LSOs, the ESUs and the CMCU in order to resolve these issues and process the data accordingly. All parties involved are encouraged to provide sufficient information to streamline this process as much as possible. Unfortunately, there are still instances where instruments faults remain undetected and large quantities of data are lost. Summaries of the more common reasons for data loss are discussed below.

NOx converters
At each QA/QC intercomparison, a small number of NOx converters are found to be less than the required 95% efficient. Where this is the case, the information from ESU service and repairs are checked to try to find the last date at which an acceptable converter test result has been obtained, or to identify an event which may indicate when the fault actually occurred (eg substitution of a replacement analyser). In some cases, no relevant information is available, and in the worst-case situation, data will be rejected back to the previous service visit (often 6 months previous). To minimise the risk of this, the QA/QC Unit has repeatedly requested that ESU's carry out converter tests at all service visits, and at relevant repair call-outs.

In a limited number of cases, the analyser software has been altered by the ESU to correct the NO_2 output where the measured converter efficiency is less than 100%. This does not correctly scale both NOx and NO channels, and could potentially lead to erroneous data which cannot be corrected. ESU's have been asked to ensure settings (where adjustable) are set to 100%.

Noisy analyser outputs
There are several analysers on the network that produce very noisy signal outputs. Many of these have been highlighted in previous reports, and ESUs have been made aware of them. The most common offenders are CO and SO_2 analysers. An example is shown in Figure 7.2

Figure 7.2 Example of Poor Quality Data



Rapid drifts or erratic changes in zero or calibration factor
Some analysers have a tendancy to drift over time. In most cases, these can be accommodated using manual calibration values, assisted by daily autocalibration data. However, some drift so rapidly that it is difficult to establish where the signal baseline actually lies. Figure 7.2 also shows erratic changes in baseline, both step-changes and baseline drift.

Leaks
Both gaseous and particle analysers are susceptible to leaks. The analysers are tested for this at 6-month QA/QC visits, and at ESU visits. Where leaks are identified, information is sought as to when this might have occurred, and an assessment is made of the likely effect on data quality. Small leaks are unlikely to have a major effect on measured data; where the leak is more substantial, the effect is often visible in the measured data, particularly when compared with data from other nearby sites.

Leaks in the bypass flow on a TEOM analyser may affect the particle size fraction of the analyser inlet.

Air conditioning faults
Most of the sites have air conditioning units to control internal temperature. If these units fail, the internal temperature may rise significantly, or may vary by an unacceptable degree. Varying temperatures often cause analysers output signal to change, and the reliability of analysers is significantly reduced when exposed to elevated temperatures. CO analysers in particular suffer from signal drift when the temperature is not well controlled. The particularly hot spell in June and July 2006 caused many sites to malfunction through overheating, or were switched off to prevent damage. In other cases, the failure of the air conditioning unit causes frequent or prolonged disruption to the site power supply. Significant problems have been experienced during 2006 at Bradford Centre, Brentford Roadside, Cwmbran, Hull Freetown Redcar, Sheffield Centre, Southampton Centre and Wirral Tranmere, amongst others.

Automatic calibration run-on
As described in Section 2.4, there have been persistent problems across the network with the daily span checks for NO_2 (and less so for SO_2) causing run-on into the ambient data. This only occurs where the span check is provided by a permeation tube, and commonly results in the loss of up to one hour's data each day. This problem has been raised with the ESUs, and considerable progress has been made to reduce the problem. In many cases, the run-on is reduced to acceptable levels by reducing the concentration of the span check gas, and several ESUs are now installing permeation tubes with lower permeation rates.

7.7.1 Site calibration cylinders

The site cylinder concentrations are reassessed at each QA/QC audit. Any outliers (>10% from certified value) are investigated and where necessary, replaced. If the recalculated concentration casts doubt on the validity of the calibrations, the cylinders may be returned to the QA/QC Unit for recertification; alternatively, the site audit may be repeated.

Following the summer 2006 intercalibration exercise, 9 cylinders (8 NO and 1 SO_2) were returned to AEA for recalibration; after the winter 2007 exercise, a further 3 were identified for recertification. There were several more cylinders which were empty before recertification could take place.

Although many NO_2 cylinders are identified as outliers during the intercalibration exercise, these are not recalibrated as the concentrations are not used directly for data scaling purposes.

7.7.2 CEN

The European Committee for Normalisation (CEN) have prepared a series of documents prescribing how analysers must be operated, to produce datasets that conform to the Data Quality Objectives of the EC Directives. The CEN documents for operation of air pollution analysers; BS EN14211 (NOx), BS EN14212 (SO_2), BS EN14626 (CO) and BS EN14625 (O_3) set out a series of performance criteria for analysers which must be achieved, both in the field and under laboratory conditions.

By way of example, the performance of an analyser in the field must pass a number of tests, including:

- Linearity – the analyser must have a maximum error at any point of less than 6% of the predicted value. AEA now reports maximum residuals from linearity tests, to evaluate the performance of current analysers against these tougher requirements.

- NOx converter efficiency must be better than 95%. Data must be rescaled for efficiencies between 95 and 99.9%, but rejected if below 95%. Again, this is tighter than currently, where we accept "borderline" failures.In addition, specific procedures for undertaking converter efficiencies tests have been prescribed; AEA already use the CEN method for undertaking converter tests.

- The sampling system that delivers air to the analyser must remove no more than 2% of the pollutant to be analysed. AEA continue to evaluate systems to calibrate sampling systems, but this is not currently undertaken on a routine basis in the UK. A report on the evaluation of methodologies to test losses of gases to sampling manifolds has been completed by QA/QC Unit and this is available on the AURN Hub and Air Quality Archive.

- The concentration of the site cylinders will need to be determined every six months, and the revised values used to scale ambient data. This is a change to our current procedures, where no action is taken until a cylinder deviates from its stated value by more than 10%. AEA have introduced a new procedure for handling drifting cylinder concentrations. In future, the uncertainty of these calculations will need to be substantially lower than the current 10% limit (in the order of 4-5% maximum).

- The determination of an SO_2 analyser response to meta xylene will not be required for ongoing field tests. For the AURN, AEA will continue to assess the performance of the hydrocarbon kickers, but action will not be recommended unless the result is very high (greater than 50ppb response to a 1ppm m xylene cylinder), indicating that the kicker has failed completely.

The CEN operating methodologies are now finalised and published and are, at present, being incorporated into the requirements of the Framework and Daughter Directives. It is likely that Member States will have until 1 January 2008 to ensure their monitoring networks are compliant. AEA have taken steps to ensure the procedures used in the UK comply with the requirements ahead of any imposed deadlines. To this end, the procedures used for the network intercomparison were fully compliant with the CEN protocols. ESU's have also been instructed to ensure pre and post service tests are compliant with the procedure; AEA have supplied them with spreadsheets to ensure the correct data are recorded.

7.8 Site Closures, Refurbishments and Infrastructural Repairs

During 2006, a significant amount of data were lost through site closures for relocation or refurbishment. The sites worst affected are given in Table 7.3

Table 7.3 Sites Subject to Closure or Relocation, 2006

Site	Monitoring stopped	Monitoring restarted	Reason	Days lost
Bristol Centre	15 Sept 05	14 June 06	Relocation to Bristol St Pauls	272
Swansea	7 Aug 06	20 Sept 06	Relocation to Swansea Roadside	42
Southwark Roadside	21 Feb 06	-	Site expected to be re-commissioned with NOx only	-

Whilst some degree of data loss was inevitable in these cases, all possible efforts should be made in future to minimise the data loss due to site closures.

In addition, a number of sites have been affected by nearby building works, Some of these have measured elevated pollutant levels during this work, particularly particles. The most significant building works affected Newcastle Centre, Bradford, Leeds, Middlesbrough, Nottingham and Glasgow Centre.

A considerable amount of data have been lost at Plymouth as a result of a partial roof collapse affecting both the gaseous and particle inlets. It is recommended that this is permanently repaired and safe access provided for measurement of TEOM flowrates at the sampling head; it is even more important to measure flows externally with FDMS than with conventional TEOM units.

8 Changes to the Network

8.1 Changes During 2006

There have been several changes to network sites during 2006; these are summarised in Table 8.1

Table 8.1 Significant Changes to the Network, 2006

Site	Monitoring stopped	Monitoring started	Reason
Auchencorth Moss	-	1 Jan 06	PM $_{2.5}$ and PM_{10} analysers only; O_3 commissioned 30 Oct 06
Belfast Clara St	-	-	BAM analyser replaced with TEOM
Bristol Centre	15 Sept 05	14 June 06	Relocation to Bristol St Pauls
Fort William		21 June 06	Final DD3 site
London Bromley CO	1 Jan 2006	-	Analyser de-affiliated
Swansea	7 Aug 06	20 Sept 06	Relocation to Swansea Roadside. The new site includes FDMS TEOMs for both $PM_{2.5}$ and PM_{10}
Southwark Roadside	21 Feb 06	-	Site expected to be re-commissioned with NOx only

In addition, the monitoring equipment has been replaced at Leeds Centre (April 2005), Exeter Roadside (23 March) Norwich Centre (14 July) and Southend on Sea (29 July).

8.2 Changes Planned in 2007

As a result of the equivalence trials of particle analysers carried out by Bureau Veritas in 2004 and 2005, it was noted that the TEOM was not equivalent to the reference method for measurement of particle concentrations (See report BV/AQ/AD202209/DH2396 available at http://www.airquality.co.uk/archive/reports/reports.php?action=category&section_id=13). As a result, a programme of upgrade of the TEOM units has been implemented.

During 2007, many of the TEOM PM_{10} analysers in the network will be upgraded to FDMS units. A schedule for upgrade was circulated by Bureau Veritas in 2006. Upgrades will be carried out at 20 fully-funded sites (17 in critical agglometations/zones). The physical nature of the FDMS unit will present problems in installing at some sites.

As a result of these changes, the QA/QC Unit has developed the following:

- Software and procedures to allow ratification of these data, which are more complex than for TEOMs
- Audit procedures to ensure correct operation
- LSO manual-now available at http://www.aeat.co.uk/com/AURNHUB/lsoman.html

Many further changes in the network are anticipated in 2007 and beyond. In addition to the upgrade of TEOMs to FDMS described above, two BAM analysers will also be installed. In the future, many changes in site numbers and location will be required when the revised EU Air Quality Directive is finalised. Planning for this commenced in 2006 and will continue throughout 2007.

9 ISO17025 Accreditation

The QA/QC Unit has maintained its ISO17025 accreditation for 6-monthly site calibrations and calibration of ambient gas mixtures. A copy of the schedule can be found at http://www.ukas.org.uk/calibration/lab_detail.asp?lab_id=902&vMenuOption=3
During 2005, this accreditation was extended to cover field operations carried out from the AEA office at Glengarnock, Ayrshire.

A total of four surveillance and assessment visits were carried out by UKAS- two at monitoring sites, one at Harwell and one at Glengarnock.

10 Usage of AURN Data

The primary aims and objectives of the AURN are listed as follows:

- Meeting statutory requirements (e.g. EC Directives)
- Informing the public about air quality
- Providing information for local air quality review and assessment
- Identifying long term trends
- Assessment of policy effectiveness

The data collected from the AURN sites in 2006 have now been fully ratified and quality assured. – this ensures that the data are of high quality and reliable and hence can be used to fulfil these objectives.

The data will be assessed in relation to the EC Air Quality Directives to determine any areas of exceedence of limit values etc, which will be reported to the European Commission in September 2007, as required by the Directives. In addition, the full dataset for 2006 will be uploaded to the European Air Quality database http://airbase.eionet.eu.int/

The public has been kept informed of air quality concentrations through direct access to the AURN data via the UK Air Quality Information website (www.airquality.co.uk). Provisional data are updated onto this website every hour and the ratified data are uploaded every 3-months following the quarterly ratification cycle described in these Data Ratification reports. A full annual summary of the data for 2006 will also be published later in 2007 as part of the "Air Pollution in the UK" series of reports.

The data are widely used by Local Authorities as part of their review and assessment process. Data from individual stations are used in the specific local area and the full AURN dataset is used within the preparation of the Pollution Climate maps of the UK which provide background concentration maps for the whole of the UK.

Long-term trend analysis is included in the Air Pollution in the UK series of reports and the AURN data are also used to calculate the UK Air Quality Indicator for Sustainable Development. The indicators based on the final dataset for 2006 are available at http://www.defra.gov.uk/news/2007/070501a.htm .

Previous years AURN data were extensively used in the development and current updating of the UK Air Quality Strategy. In addition, AURN data, along with other UK data sets, have been extensively used by the UK Air Quality Expert Group (AQEG) in the development of a series of reports –
Air quality and climate change: a UK perspective - April 2007
Particulate Matter in the UK – 2005
Nitrogen Dioxide in the UK – 2004

AQEG are current preparing reports on Trends in Primary Nitrogen Dioxide in the UK and Ozone in the UK and these will also make extensive use of AURN data.

11 Safety

Safety is clearly an important aspect of network operation. AEA undertakes regular extensive risk assessments of all its activities on-site, to ensure that its staff are not exposed to unsafe practices while working. Any items deemed to pose an unacceptable risk are brought to the attention of the site owner or the CMCU.

There are no issues identified that presented significant risk during the winter 2006 intercalibration exercise. The issue of safe roof access, to audit PM_{10} analyser flow rates has largely been worked around. This has been achieved either by installing ladder securing points on the outside of the huts, or by auditing flow rates inside the monitoring station. However, performing flow measurements inside means that we are unable to perform satisfactory leak tests on the entire sampling systems of these analysers.

It is important that safe access to the TEOM head is possible where FDMS TEOMs are employed, as it is not possible to fully leak check the system from inside the monitoring enclosure. As at April 2007, there are a number of sites where this is not the case. The access to roof-mounted equipment should be considered when acquiring or upgrading monitoring stations.

Recommendation

Safe roof access to the TEOM head should be provided at sites where FDMS units are deployed

The Gas Supply Contractor undertakes regular inspection and maintenance of the gas regulators on site to ensure compliance with the relevant pressure systems regulations.

Appendices

Appendix A1: Recommendations for Upgrade or Replacement of Equipment

Appendix A2: Critical Sites in the AURN (January 2007)

Appendix A3: Inventory of Defra-Owned Equipment

Appendix A4: Summary of Recommendations

Appendix B1 Site Details

Appendix A1

Recommendations for Upgrade or Replacement of Equipment

As requested by the Department, 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. Critical sites should be treated as high priority.	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.

	Recommendations April 2007	Priority	Action
22	Safe roof access needs to be provided for sites where FDMS TEOMs are to be deployed	High	ESU/CMCU
	Recommendations January 2007		
21	The air conditioning unit at Cwmbran should be repaired or replaced as soon as possible, and in any case before the onset of warmer weather.	High	ESU to repair air conditioning
22	ESUs to ensure all NOx converter software settings to be 100%	High	ESUs to check at service
	Recommendations October 2006		
20	The noisy analysers at Bolton (NOx) and London Westminster (CO) should be repaired or replaced at the earliest opportunity	High	ESUs to repair or replace as appropriate
	Recommendations July 2006		
19	Weybourne O_3 analyser should be upgraded to allow monthly LSO calibrations and daily autocalibrations	Medium	ESU to provide CMCU with quotation for necessary work
	Recommendations April 2006		
	None		
	Recommendations January 2006		
17	The performance of CO analysers needs close attention by all parties, and poorly performing analysers replaced or upgraded	High	LSOs and CMCU to check performance carefully; ESU's to action repairs promptly
	Recommendations July 2005		
14	Several analysers still exhibit poor performance	High	Repair/replacement to be actioned by ESUs
13	Continuing problems with some autocal run-ons causing loss of up to 2 hours per day-see Section 2.4	High	Many sites now cured, but some need attention at next ESU visit

Appendix A2

Critical Sites In The AURN (January 2007)

Table A1 Critical Sites in Agglomerations

Site Name	Agglomeration	Critical Pollutants		
		DD1	DD2[7]	DD3
Belfast Centre	Belfast Urban Area	NO_2	CO	NO_2 O_3
Blackpool Marton	Blackpool Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Bournemouth+	Bournemouth Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Brighton Preston Park	Brighton/Worthing/Littlehampton			NO_2 O_3
Brighton Roadside PM_{10}	Brighton/Worthing/Littlehampton	PM_{10}		
Bristol St Pauls	Bristol Urban Area	PM_{10} SO_2		NO_2 O_3
Cardiff Centre	Cardiff Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Coventry Memorial Park+	Coventry/Bedworth	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Edinburgh St Leonards	Edinburgh Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Glasgow Centre	Glasgow Urban Area	SO_2		NO_2 O_3
Hove Roadside+	Brighton/Worthing/Littlehampton	SO_2		
Hull Freetown	Kingston upon Hull	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Leicester Centre	Leicester Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Liverpool Speke	Liverpool Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Newcastle Centre	Tyneside	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Nottingham Centre	Nottingham Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Portsmouth+	Portsmouth Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Preston	Preston Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Reading New Town	Reading/Wokingham Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Sheffield Centre	Sheffield Urban Area	PM_{10}		
Southampton Centre	Southampton Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Southend-on-Sea	Southend Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Stoke-on-Trent Centre	The Potteries	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Swansea Roadside+	Swansea Urban Area		CO	
Wirral Tranmere	Birkenhead Urban Area	NO_2 PM_{10} SO_2	CO	NO_2 O_3

"+ indicates Affiliate site"

Note 7: Addresses CO, Benzene not included here

Table A2 Critical Sites in Zones

Site Name	Zone	Critical Pollutant		
		DD1	DD2[7]	DD3
Aberdeen+	North East Scotland	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Aston Hill	North Wales			NO_2 O_3
Barnsley Gawber+	Yorkshire & Humberside	NO_2	CO	NO_2 O_3
Bush Estate	Central Scotland			NO_2 O_3
Canterbury+	South East	PM_{10}		
Cwmbran+	South Wales	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Derry+	Northern Ireland	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Dumfries	Scottish Borders	NO_2 PM_{10}	CO	
Eskdalemuir	Scottish Borders			NO_2 O_3
Fort William	Highland			NO_2 O_3
Glazebury	North West & Merseyside			NO_2 O_3
Grangemouth+	Central Scotland	NO_2 PM_{10} SO_2	CO	
Great Dun Fell	North West & Merseyside			O_3[3]
High Muffles	Yorkshire & Humberside			NO_2 O_3
Inverness	Highland	NO_2 PM_{10}		
Leamington Spa+	West Midlands	PM_{10} SO_2	CO	NO_2 O_3
Leominster	West Midlands			NO_2 O_3
Lough Navar	Northern Ireland			O_3[3]
Narberth	South Wales			O_3[3]
Northampton+	East Midlands	NO_2 PM_{10}[2] SO_2	CO	NO_2 O_3
Northampton PM_{10}	East Midlands	PM_{10}		
Norwich Centre	Eastern			NO_2 O_3
Oxford Centre Roadside+	South East	SO_2	CO	
Plymouth Centre	South West	PM_{10}		
Scunthorpe Town+	Yorkshire & Humberside	PM_{10}		
Sibton	Eastern			O_3[3]
Somerton	South West			NO_2 O_3
St Osyth	Eastern			NO_2 O_3
Stockton-on-Tees Yarm+	North East	NO_2 PM_{10}	CO	
Strath Vaich	Highland			O_3[3]
Sunderland	North East	SO_2		
Sunderland Silkworth+	North East			NO_2 O_3
Thurrock	Eastern			NO_2 O_3
Wicken Fen	Eastern			NO_2 O_3
Wigan Centre+	North West & Merseyside	NO_2 PM_{10} SO_2	CO	NO_2 O_3
Wrexham	North Wales	NO_2 PM_{10} SO_2	CO	
Yarner Wood	South West			NO_2 O_3

Total of 62 Critical Sites (25 in Agglomerations and 37 in Zones)
51% of network stations critical under one or more Daughter Directives
"+ indicates Affiliate site"

Note 3: DD3 Critical as Rural Background station
Note 7: Addresses CO, Benzene not included here

Appendix A3

Inventory of Defra owned Equipment

An up-to-date inventory of Department-owned equipment used by the QA/QC Unit is provided below:

QA/QC Unit's inventory of Department-owned equipment, August 2006

Computer software	The HIS (Heuristic Information System) software suite used for all data management. A few specific capabilities of HIS were developed in order to meet specific Department deliverables or requirements (examples include software for annual report analysis/compilation, for formatting/transmitting network data to archive or DDU and for reporting Directive compliance data to the EC).
Field support equipment	Field support equipment: 1 intercalibration equipment set (includes mass flow controllers and read-out unit) A second intercalibration (commissioned January 2001) UV photometers: API model M401 s/n 123- purchased April 1999 (on temporary loan to Siemens) API model 401 s/n 151 - purchased October 2000 API model 401 s/n 176 – purchased December 2002 API model 401 s/n 290 – purchased May 2004 API model 401 s/n 291 – purchased May 2004 API model 401 s/n 292 purchased May 2004 API model 401 s/n 293 purchased May 2004 Mass flow controllers - purchased April 2002 (incorporated into existing audit dilution apparatus) 3 Drycal flow meters - purchased September 2002 1 Mass flow controller read-out unit to be incorporated in the audit dilution apparatus – purchased September 2002. A third intercalibration kit (commissioned May 2004) Drycal flow meter – purchased March 2004 Sabio 2010 dilution calibrator – purchased February 2005 Sabio 2020 zero air generator – purchased February 2005 Sabio 2030 ozone photometer – purchased February 2005 Sabio 2010 dilution calibrator – purchased June 2006 Sabio 2020 zero air generator – purchased June 2006 Sabio 2030 ozone photometer – purchased June 2006
Zero air pumps	6 spare zero air pumps for routine maintenance/repair of zero air generators in the AURN.
Analysers	AC31 dual chamber NO_x analyser TEI 43C SO_2 analyser TEI 48C CO analyser M265 chemiluminescent ozone analyser (All of the above purchased on behalf of Defra by Casella Stanger in March 2003 and transferred to QA/QC Unit)

Appendix A4

Summary of recommendations

This appendix provides a summary of all the recommendations given in this report.

	Need	Recommendation	Section	FAO
1	Improve data capture at critical sites	LSOs and ESUs should undertake call-outs as soon as possible at these sites	2.2 +5	LSOs and ESUs
2	Autocalibration run-on	Investigate problem of autocalibration run on at sites given in Table 2.5. Stockport Shaw Heath, Bournemouth, Dumfries, Edinburgh, Eskdalemuir, Fort William, Harwell, St Osyth and Leominster (all NO_2), London Southwark (CO and SO_2), Narberth (SO_2) should be prioritised as at least 2 hours per day are being lost at these sites. Eskdalemuir and Leominster have been highlighted as a priority in previous reports. Autocalibration span concentrations to be <200ppb for urban sites and <100ppb for rural sites.	2.4	ESUs
3	London A3 Roadside	The analyser should be run on a more appropriate range	3.2	ESU
4	Poor performance of analysers-see Section 3.6	QA/QC Unit would like to seek clarification from the Equipment Support Unit/manufacturer as to the current situation regarding the reason for the problems and what plans are in place to resolve them. We recommend that immediate attention is given to this issue as the majority of these instruments are located at critical sites.	3.4	ESU

Appendix B1
Site Details

Site Name	Manifold type	Grid Reference	6 figure easting	6 figure northing	Longitude	Latitude	Altitude
Aberdeen	Glass	NJ944074	394416	807408	57° 9' 27.1" N	2° 5' 38" W	10
Aston Hill	Glass	SO299901	329902	290062	52° 30' 13.3" N	3° 02' 3" W	370
Auchencorth Moss	N/a	NT222561	322227	656143	55° 47' 32"N	3° 14' 31"W	270
Barnsley 12	Narrow-bore Teflon	SE343065	434276	406542	53° 33' 16" N	1° 29' 3" W	120
Barnsley Gawber	Wide-bore Teflon	SE325075	432529	407472	51° 33' 46" N	1° 30' 37" W	105
Bath Roadside (new)	Narrow-bore Teflon	ST755658	375473	165845	51° 23' 27.7" N	2° 21' 14.4" W	35
Belfast Centre	Glass				54° 35' 58.8" N	5° 55' 39.3"W	10
Belfast Clara St	N/A				54° 35' 27.3" N	5° 53' 39.4" W	10
Belfast East	Narrow-bore Teflon				54° 35' 47.5"N	5° 54' 2.1"W	10
Billingham	Glass	NZ470237	446962	523650	54° 36' 21" N	1° 16' 28" W	15
Birmingham Centre	Glass	SP063869	406342	286862	52° 28' 47" N	1° 54' 29" W	140
Birmingham East	Glass	SP115889	411520	288882	52° 29' 52" N	1° 49' 54" W	100
Birmingham Tyburn	Glass	SP116905	411625	290457	52° 30' 43" N	1° 49' 48" W	95
Blackpool Marton	Wide-bore Teflon	SD339347	333856	434738	53° 48' 17.2" N	3° 0' 20.6" W	0
Bolton	Wide-bore Teflon	SD710086	371000	408562	53° 34' 22" N	2° 26' 22" W	105
Bottesford	Narrow-bore Teflon	SK798377	479768	337654	52° 55' 49" N	0° 48' 53" W	30
Bournemouth	Narrow-bore Teflon	SZ123933	412320	93344	50° 44' 22" N	1° 49' 36" W	10
Bradford Centre	Wide-bore Teflon	SE166331	416615	433098	53° 47' 38" N	1° 45' 50" W	102
Brentford Roadside	Narrow-bore Teflon	TQ174780	517425	178074	51° 29' 20.2" N	0° 18' 33"	10
Brighton Preston Park	Wide-bore Teflon	TQ305062	530508	106222	50° 50' 27" N	0° 8' 52" W	30
Brighton Roadside	Glass	TQ313043	531307	104305	50° 49' 24" N	0° 8' 14" W	10
Brighton Roadside PM10		TQ313043	531322	104302	50° 49' 24 N	0° 8' 13" W	10
Bristol Centre	Glass	ST594733	359427	173285	51° 27' 25" N	2° 35' 7" W	15
Bristol Old Market	Glass	ST596732	359570	173173	51° 27' 22" N	2° 35' 59" W	20
Bristol St Paul's	Glass	ST595739	359501	173935	51° 27'46.3" N	2° 35' 4.3"W	15
Bury Roadside	Glass	SD809048	380922	404772	53° 32' 21" N	2° 17' 22" W	100

Site Name	Manifold type	Grid Reference	6 figure easting	6 figure northing	Longitude	Latitude	Altitude
Bush Estate	High Flow wide tube	NT246639	324626	663880	55° 51' 44" N	3° 12' 22" W	185
Cambridge Roadside	Narrow-bore Teflon	TL452582	545248	258155	52° 12' 9" N	0° 7' 26" E	10
Camden Kerbside	Narrow-bore Teflon	TQ266844	526640	184433	51° 32' 41" N	0° 10' 31" W	50
Canterbury	Narrow-bore Teflon	TR162573	616198	157330	51° 16' 25" N	1° 5; 55" E	30
Cardiff Centre	Glass	ST184765	318417	176505	51° 28' 53" N	3° 10' 34" W	12
Coventry Memorial Park	Wide-bore Teflon	SP328773	432801	277340	52° 23' 35" N	1° 31' 10" W	95
Cwmbran	Wide-bore Teflon	ST305954	330510	195436	51° 39' 11.7" N	3° 0' 20.2" W	65
Derry	Wide-bore Teflon				55° 0' 1.5" N	7° 19' 42.1" W	25
Dumfries	Narrow-bore Teflon	NX970763	297012	576278	55° 4' 14" N	3° 36' 52" W	20
Edinburgh Centre	Glass	NT255738	325523	673850	55° 57' 07" N	3° 11' 39" W	40
Edinburgh St Leonards	Glass	NT263731	326250	673132	55° 56' 44" N	3° 10' 57" W	30
Eskdalemuir	Narrow-bore Teflon	NT235030	323528	603030	55° 18' 55.1" N	3° 12' 22" W	260
Exeter Roadside	Stainless Steel	SX919928	291940	92840	50° 43' 30" N	3° 31' 56" W	35
Fort William	Narrow-bore Teflon	NN108744	210849	774421	56° 49' 21.8" N	5° 6' 4.1" W	5
Glasgow Centre	Wide-bore Teflon	NS589650	258902	665028	55° 51' 28.4" N	4° 15' 21" W	5
Glasgow City Chambers	Narrow-bore Teflon	NS595653	259528	665308	55° 51' 38" N	4° 14' 45" W	15
Glasgow Kerbside	Wide-bore Teflon	NS587652	258708	665200	55° 51' 33" N	4° 15' 32" W	10
Glazebury	Narrow-bore Teflon	SJ687960	368733	396034	53° 27' 36" N	2° 28' 21" W	20
Grangemouth	Wide-bore Teflon	NS938810	293840	681032	56° 0' 38" N	3° 42' 15" W	5
Great Dun Fell	Narrow-bore Teflon	NY710322	371020	532190	54° 41' 2.4" N	2° 27' 4" W	850
Haringey Roadside	Narrow-bore Teflon	TQ339907	533885	190669	51° 35' 56" N	0° 4' 6" W	15
Harwell	Wide-bore Teflon	SU468860	446772	186020	51° 34' 16" N	1° 19' 36" W	125
High Muffles	Wide-bore Teflon	SE775939	477535	493865	54° 20' 4" N	0° 48' 33" W	260
Hove Roadside	Glass	TQ301045	530088	104484	50° 49' 31" N	0° 9' 16" W	30
Hull Centre	Glass	TA097289	509700	428885	53° 44' 41" N	0° 20' 17"W	5
Hull Freetown	Glass	TA095293	509478	429329	53° 44' 55.1" N	0° 20' 27" W	0
Inverness	Glass	NH657457	265720	845680	57° 28' 53.5" N	4° 14' 29" W	10

Site Name	Manifold type	Grid Reference	6 figure easting	6 figure northing	Longitude	Latitude	Altitude
Ladybower	Wide-bore Teflon	SK166896	416575	389565	53° 24' 10" N	1° 45' 8" W	360
Leamington Spa	Glass	SP319657	431932	265743	52° 17' 20" N	1° 31' 59" W	55
Leeds Centre	Glass	SE300343	429976	434268	53° 48' 13" N	1° 32' 47" W	60
Leicester Centre	Glass	SK588041	458767	304083	52° 37' 53" N	1° 7' 59" W	65
Leominster	Glass	SO498584	349773	258387	52° 13' 17" N	2° 44' 12" W	75
Lerwick	Narrow-bore Teflon	HU453397	445345	1139685	60° 8' 21" N	1° 11' 8" W	85
Liverpool Centre	Glass	SJ349906	334887	390638	53° 24' 31" N	2° 58' 51" W	20
Liverpool Speke	Glass	SJ439836	343860	383598	53° 20' 47" N	2° 50' 41" W	35
London A3 Roadside	Wide-bore Teflon	TQ190652	518983	165220	51° 22' 25" N	0° 17' 31" W	30
London Bexley	Glass	TQ519764	551852	176396	51° 27' 58" N	0° 11' 05" E	10
London Bloomsbury	Glass	TQ301820	530107	182041	51° 31' 02" N	000° 07' 14" W	20
London Brent	Glass	TQ196893	519570	189275	51° 35' 23" N	000° 16' 31" W	50
London Bromley	Narrow-bore Teflon	TQ405693	540533	169334	51° 24' 20" N	000° 1' 09" E	65
London Cromwell Road 2	Wide-bore Teflon	TQ265790	526530	178975	51° 29' 44" N	000° 10' 43" W	5
London Eltham	Narrow-bore Teflon	TQ440747	543978	174668	51° 27' 10" N	0° 4' 15" E	65
London Hackney	Wide-bore Teflon	TQ348862	534812	186230	51° 33' 32" N	0° 3' 24" W	20
London Haringey	Narrow-bore Teflon	TQ299891	529914	189132	51° 35' 10" N	0° 7' 34" W	40
London Harlington	Narrow-bore Teflon	TQ083778	508299	177809	51° 29' 20" N	0° 26' 30" W	25
London Hillingdon	Glass	TQ069786	506933	178607	51° 29' 47" N	0° 27' 40" W	25
London Lewisham	Narrow-bore Teflon	TQ377737	537680	173685	51° 26' 44" N	0° 1' 13" W	20
London Marylebone Road	Glass	TQ281820	528120	182000	51° 31' 21" N	000° 09' 17" W	30
London N. Kensington	Narrow-bore Teflon	TQ240817	524040	181740	51° 31' 16" N	000° 12' 48" W	20
London Southwark	Glass	TQ322786	532245	178565	51° 29' 26" N	000° 05' 48" W	20
London Teddington	Glass	TQ155704	515538	170427	51° 25' 16" N	000° 20' 23" W	20
London Wandsworth	Narrow-bore Teflon	TQ258747	525778	174677	51° 27' 26" N	000° 11' 28" W	10
London Westminster	Glass	TQ298789	529796	178949	51° 29' 41" N	000° 07' 54" W	0
Lough Navar	Glass				54° 26' 21.5" N	7° 53' 55.9" W	

Site Name	Manifold type	Grid Reference	6 figure easting	6 figure northing	Longitude	Latitude	Altitude
Lullington Heath	Wide-bore Teflon	TQ539018	553855	101740	50° 47' 41" N	000° 10' 54" E	115
Mace Head	Narrow-bore Teflon				53° 19' 35.2''N	9° 54' 14.1''W	5
Market Harborough	Glass	SP833959	483337	295905	52° 53' 17" N	000° 46' 20" W	145
Manchester Piccadilly	Glass	SJ843983	384310	398325	53° 28' 53"N	2° 14' 16" W	60
Manchester South	Glass	SJ839858	383912	385828	53° 22' 09"N	2° 14' 36" W	65
Manchester Town Hall	Wide-bore Teflon	SJ839980	383874	397976	53° 28' 42"N	2° 14' 40" W	60
Middlesbrough	Glass	NZ505196	450480	519632	54° 34' 10" N	001° 13' 16" W	5
Narberth	Wide-bore Teflon	SN146127	214640	212700	51° 46' 56" N	004° 41' 19" W	160
Newcastle Centre	Glass	NZ250649	425016	564940	54° 58' 42" N	001° 36' 38" W	45
Northampton	Glass	SP761645	476111	264524	52° 16' 25" N	0° 53' 09" W	125
Norwich Centre	Wide-bore Teflon	TG231089	623078	308910	52° 37' 55" N	001° 17' 42" E	20
Norwich Roadside (new)	Narrow-bore Teflon	TG230085	622998	308521	52° 37' 43" N	001° 17' 37" E	35
Nottingham Centre	Glass	SK574401	457420	340050	52° 57' 17" N	001° 08' 48" W	40
Oxford Centre	Wide-bore Teflon	SP514062	451366	206152	51° 45' 06" N	001° 15' 26" W	60
Plymouth Centre	Glass	SX477546	247742	54610	50° 22' 18" N	004° 08' 33" W	10
Port Talbot	Glass	SS780882	278036	188249	51° 34' 48" N	3° 45' 42" W	30
Portsmouth	Glass	SU657036	465686	103607	50° 49' 42" N	001° 04' 07" W	5
Preston	Wide-bore Teflon	SD552301	355248	430143	53° 45' 56" N	002° 40' 49" W	45
Reading New Town	Wide-bore Teflon	SU734732	473441	173198	51° 27' 11" N	000° 56' 40" W	45
Redcar	Glass	NZ600246	459975	524563	54° 36' 46" N	001° 4' 22" W	5
Rochester	Narrow-bore Teflon	TQ831762	583133	176220	51° 27' 19" N	000° 38' 04"E	14
Rotherham Centre	Teflon coated metal	SK431930	443088	393028	53° 25' 56" N	001° 21' 11" W	40
Salford Eccles	Glass	SJ779987	377932	398713	53° 29' 05" N	002° 20' 02" W	30
Sandwell West Bromwich	Glass	SP003915	400395	291503	52° 31' 17" N	001° 59' 44" W	165
Scunthorpe	Narrow-bore Teflon	SE906107	490592	410689	53° 35' 06" N	000° 37' 59" W	35
Scunthorpe Town	TBA	SE904108	490421	410812	53° 35' 9.9" N	000° 38' 7.7 W	35
Sheffield Centre	Glass	SK351868	435134	386885	53° 22' 40" N	001° 28' 24" W	75
Sheffield Tinsley	Glass	SK402906	440240	390585	53° 24.639' N	001° 23.770 W	45

Site Name	Manifold type	Grid Reference	6 figure easting	6 figure northing	Longitude	Latitude	Altitude
Sibton	Wide-bore Teflon	TM363719	636295	271870	52° 17' 39" N	001° 27' 49" E	45
Somerton	Wide-bore Teflon	ST485265	348544	126525	51° 02' 09" N	002° 44' 07" W	45
Southampton Centre	Glass	SU426123	442565	112255	50° 54' 30" N	001° 23' 46" W	5
Southend-on-Sea	Wide-bore Teflon	TQ856861	585566	186130	51° 32' 37.6" N	000° 40' 29" E	35
Southwark Roadside	Wide-bore Teflon	TQ346777	534621	177680	51° 28' 55" N	000° 03' 46" W	5
St Osyth	Glass	TM104132	610426	213205	51° 46' 41" N	001° 02' 56" E	5
Stockport Shaw Heath	Glass	SJ894896	389386	389604	53° 24' 11" N	002° 09' 40" W	75
Stockton-on-Tees Yarm	Wide-bore Teflon	NZ419129	441908	512886	54° 30' 34" N	001° 21' 15" W	10
Stoke-on-Trent Centre	Wide-bore Teflon	SJ883479	388348	347894	53° 01' 42" N	002° 10' 31" W	180
Strath Vaich	Wide-bore Teflon	NH348748	234829	874785	57° 43' 56" N	004° 46' 33" W	270
Sunderland	Narrow-bore Teflon	NZ399570	439855	556990	54° 54' 22" N	001° 22' 48" W	20
Sunderland Silksworth	Wide-bore Teflon	NZ381545	438142	554478	54° 53' 1" N	001° 24' 25" W	110
Swansea Roadside	Glass	SS653945	265341	194458	51° 37' 58"N	3° 56' 51"W	54
Thurrock	Glass	TQ610779	561018	177894	51° 28' 38" N	000° 19' 02" E	5
Tower Hamlets Roadside	Narrow-bore Teflon	TQ359822	535914	182230	51° 31' 22" N	000° 02' 32" W	10
Walsall Alumwell	Narrow-bore Teflon	SJ994983	399374	298264	52° 34' 56" N	002° 00' 38" W	130
Walsall Willenhall	Glass	SJ979012	397860	201173	52° 36' 30" N	002° 01' 59" W	150
West London	Wide-bore Teflon	TQ250788	525041	178751	51° 29' 38" N	000° 12' 01" W	5
Weybourne	Narrow-bore Teflon	TG098438	609832	343775	52° 57' 01" N	001° 07' 19" E	20
Wicken Fen	Wide-bore Teflon	TL563692	556310	269210	52° 17' 56" N	000° 17' 27" E	10
Wigan Centre	TBA	SD578060	357825	406025	53° 32' 58" N	002° 38' 17" W	45
Wirral Tranmere	Wide-bore Teflon	SJ321866	332096	386644	53° 22' 20.9"N	003° 01' 17.5" W	30
Wolverhampton Centre	Glass	SO914989	391368	298942	52° 35' 18" N	002° 07' 44" W	150
Wrexham	Glass	SJ329499	332862	349904	53° 02' 32" N	003° 00' 10" W	80
Yarner Wood	Wide-bore Teflon	SX786789	278605	78948	50° 35' 51" N	003° 42' 59" W	120