

UK Automatic Urban Network London Air Quality Network Affiliated Sites

Management Report April to June 2008

**Prepared for the Department for Environment, Food and Rural
Affairs (DEFRA), Scottish Executive, Welsh Assembly Government
and the DoE in Northern Ireland**

Title	UK Automatic Urban Network London Air Quality Network Affiliated Sites Management Report, April to June 2008
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Customer	Department for Environment, Food and Rural Affairs (DEFRA), Scottish Executive, Welsh Assembly Government and the DoE in Northern Ireland
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Customer Ref	EPG 1/3/168
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File Reference	ERG\Airquali\London\DEFRA\Report\2008
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Report Number	KCLERG\MT\DEFRA\CMCU\Q22008
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1 Introduction

This report details the equipment performance for the AURN affiliate sites where the King's College London Environmental Research Group (ERG) is contracted as the Central Management Unit and Control Unit (CMCU) by DEFRA under contract number EPG 1/3/168. The report highlights issues causing data capture to fall below 90% during the period April to June 2008.

2 Routine Data Handling

The routine handling of data from the air sampling through to the dissemination of verified data to the QA/QC Unit is a multi stage process. Data is stored on site in either an external logging system or in individual, in-built analyser logging systems. This is the first stage of quality control as many loggers and analysers are capable of diagnosing faults and identifying them as non-ambient data. Data is collected every hour from each air quality monitoring site using the MONNET data handling software and transferred to an MS-SQL database. After data collection, files are placed in an import queue to await processing, in practice the processing power of the KCL air quality server is such that files are processed in a matter of seconds. During this transfer process raw data is checked against algorithms to ensure data quality and data is scaled according to the last known calibration response. Both scaled and raw measurements are stored in the MS-SQL database, this ensures that data can be rescaled from the raw values if necessary.

Data is disseminated to the DDU on an hourly basis by email. Data collection calls are scheduled to complete within the first 20 minutes of each hour. This enables an email to be automatically assembled and dispatched at 27 minutes past the hour, arriving sufficiently early to update the National Air Quality Archive at 45 minutes past the hour.

Manual verification occurs twice daily, this aims to confirm valid data, record site events, identify and diagnose analyser faults.

Fifteen-minute mean measurements, including those diagnosed as non-ambient, are transferred to the QA/QC Unit at the start of each month in the format required. Data from the automatic overnight calibrations and routine LSO visits are also supplied.

2.1 Data Dissemination Performance

Between April and June 2008, ERG estimate that 98% of hourly emails arrived at the DDU to meet their timetabled requirements. Accurate figures of punctual e-mails can be obtained from the DDU.

3 Quality Control / Quality Assurance (QA/QC)

Sites affiliated to the AURN are operated in accordance with the Network Operations Manual and any additional QA/QC procedures requested. Through close liaison with the local authorities and the LSOs, the QA/QC unit is provided with unrestricted access to the monitoring sites.

3.1 QA/QC Site Audits

There were no audits carried out by the QA/QC Unit (AEA) at the London affiliated AURN sites during the second quarter of 2008. However a pre-affiliation check was carried out on the new PM2.5 FDMS instrument at Eltham on 13th June.

4 Changes to sites affiliated to the AURN

The AURN is in the process of reorganisation due to the requirements of the EU Directive on ambient air quality and cleaner air for Europe (PE-CONS 3696/07). This resulted in the de-affiliation of several sites from the LAQN at the end of September 2007 and the affiliation of several sites from networks managed by King's. The sites identified for affiliation to the AURN and the current status of the site is shown in Table 1

Site	Current Status
Horley	Affiliated 21/11/07
Stewartby	Affiliated 26/11/07
Stanford-le-Hope Roadside	Affiliated 22/01/08
London Haringey (NO _x)	Affiliated 29/11/07
London Bexley (PM _{2.5})	Affiliated 25/02/08
London Harrow	Awaiting installation of Defra PM _{2.5} instrument
Sandy Roadside	Affiliated 28/07/08
Storrington Roadside	Awaiting site installation
Eastbourne Background	Awaiting site installation

Table 1: Sites managed by King's which have been identified for affiliation to the AURN

5 Quarterly Data Capture Statistics

Data capture rates for April, May and June are detailed in Table 2, Table 3, and Table 4. The data capture for each month was calculated from valid hourly averages, after excluding data lost due to calibration and the faults discussed. The overall data capture for the quarter April to June are detailed in the Table 5.

Specific issues affecting data collection and quality at each site are discussed in 5.1 to 5.4. Details of faults are specified where data capture falls below 90% for the quarter.

Site	Hourly Data Capture % for April 2008					
	CO	PM ₁₀	NO _x	O ₃	SO ₂	PM _{2.5}
Stewartby					99.3	
London Bexley						99.9
Camden Kerbside		98.5	71.8			
Eltham			98.9	99.0		-
Haringey Roadside		97.9	99.7			
London Haringey			99.9	98.1		
London North Kensington	99.3	99.4	99.6	99.4	99.4	
Marylebone Road	99.2	98.8	99.2	99.3	99.3	
Horley			97.2			
Southwark Roadside		-	-			
Tower Hamlets Roadside	99.9		99.7			
Stanford-le-Hope Roadside		99.3	99.2		99.2	

Table 2: Hourly data capture for April 2008

Site	Hourly Data Capture % for May 2008					
	CO	PM ₁₀	NO _x	O ₃	SO ₂	PM _{2.5}
Stewartby					98.8	
London Bexley						99.9
Camden Kerbside		99.7	99.3			
Eltham			71.6	78.9		52.2
Haringey Roadside		99.9	99.7			
London Haringey			99.7	99.7		
London North Kensington	98.9	99.1	99.5	99.3	98.8	
Marylebone Road	85.8	95.4	95.7	95.8	95.4	
Horley			99.7			
Southwark Roadside		-	-			
Tower Hamlets Roadside	99.3		99.6			
Stanford-le-Hope Roadside		99.9	99.6		99.6	

Table 3: Hourly data capture for May 2008

Site	Hourly Data Capture % for June 2008					
	CO	PM ₁₀	NO _x	O ₃	SO ₂	PM _{2.5}
Stewartby					99.4	
London Bexley						88.8
Camden Kerbside		100.0	99.7			
Eltham			94.9	99.7		99.3
Haringey Roadside		99.7	99.6			
London Haringey			86.9	99.6		
London North Kensington	99.4	99.9	99.3	99.3	99.0	
Marylebone Road	99.7	99.2	99.7	73.1	99.7	
Horley			99.9			
Southwark Roadside		-	-			
Tower Hamlets Roadside	86.7		99.4			
Stanford-le-Hope Roadside		99.9	99.7		99.7	

Table 4: Hourly data capture for June 2008

Site	Hourly Data Capture % for April to June 2008					
	CO	PM ₁₀	NO _x	O ₃	SO ₂	PM _{2.5}
Stewartby					99.2	
London Bexley						96.2
Camden Kerbside		99.4	90.4			
Eltham			88.3	92.4		50.5
Haringey Roadside		99.2	99.7			
London Haringey			95.6	99.1		
London North Kensington	99.2	99.5	99.5	99.4	99.1	
Marylebone Road	94.8	97.8	98.2	89.5	98.1	
Horley			99.0			
Southwark Roadside		-	-			
Tower Hamlets Roadside	95.3		99.6			
Stanford-le-Hope Roadside		99.7	99.5		99.5	

Table 5: Hourly data capture for April to June 2008

5.1 Eltham Nitrogen Dioxide

88.3 %

23rd May to 2nd June 2008

243 Hours

The measurements from the analyser showed negative dips and the analyser started flagging an error on Friday 23rd May. A callout was issued to the ESU on Tuesday 27th May.

Due to restricted access to the site during the week commencing 26th May, the callout was attended on 2nd June when a chopper fault was found to be showing on the analyser. No fault was found with the chopper motor so the engineer cleaned the sensor that detects the chopper wheel rotation. This resolved the fault.

5.2 Eltham PM_{2.5}

50.5 %

The pre-affiliation audit by the QA/QC unit on 13th June found the k0 factor to be 3.7% too low. The QA/QC unit may correct the measurements based on the information found at the pre-affiliation check if this value is confirmed at a subsequent audit.

No other faults were found and there has been no work carried out on the analyser between the installation date and the audit. Therefore this analyser was affiliated to the AURN since installation on 15th May and data capture has been calculated from this date.

5.3 Marylebone Road Carbon Monoxide

89.5 %

15th April to 16th April 2008

22 Hours

There was short-term data logging fault. The missing measurements during this period were not recoverable.

26th May to 30th May 2008

75 Hours

There was a power cut at the site on 26th May and the power was restored on 27th May. Following the power cut, the response from the analyser was erratic and the overnight calibration readings were unstable. A callout was issued to the ESU on 29th May. The engineer attended on 30th June, replacing the chopper motor and CPU card.

13th July to 14th July 2008

31 Hours

The analyser was identified a flow fault, which resolved itself before an engineer attended site.

5.4 Southwark Roadside All Analysers

0%

The site is currently closed for relocation.

6 Contact Information

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Day-to-day operational issues can be directed to the ERG Duty Officer by telephone on 020 7848 4022 or by Email on airquality@erg.kcl.ac.uk