Current Monitoring Issues: Site Calibrations and PM baseline Current Monitoring Issues: checks.





David Hector (AEA) – 28th March 2012



2 issues that have arisen over the past year are -

Site Calibrations

Particulate Matter baseline checks











Site Calibrations



What do we want from our Scottish Air Quality Monitoring?

- Data representative of Ambient Conditions.
- Measurements that are sufficiently accurate and precise.
- Data that meets UK and European Committee for Standardisation (CEN) Standards.
- >90% Data capture
- Accurate Data for use in the LAQM Review and Assessment
- Standardised throughout Scotland



Why do we need to Routinely Calibrate?

The production of meaningful data from the Scottish Air Quality Network, necessitates the regular calibration of all analyser types using traceable transfer gas calibration standards.



- Analyser sensitivity
- Analyser Baseline
- Identification of analysers faults
 - Scale Data





To ensure optimum data quality and capture, a three tier system of calibration and analyser test procedures is recommended:-

• Daily automatic IZS (internal Zero/Span) checks.

These allow instrumental drifts to be examined, and act as a daily check on instrument performance.

• Fortnightly/monthly manual calibrations.

Used to scale raw pollution data (mV) into meaningful concentration units. Instrument drifts are fully quantified by calibrating analysers manually with documented and traceable calibration standards.

6-monthly network intercalibrations.

Performed by QA/QC unit, ensure that measurements from all network stations are completely representative and intercomparable. The intercalibrations will also act as an independent audit of the system performance at each monitoring site. In this way, any site-specific problems which may have developed and remained undetected are fully quantified.

Examples of Good Calibration Data









A number of Local Authorities have moved to AUTOMATIC CALIBRATIONS only.





- Saves resources.
- They enable rapid remote detection of system faults via the telemetry system, and thereby minimise data loss through instrument malfunction.
- The data recorded during the calibration are flagged and readily scrutinised by the Management Unit for evidence of faults.
- The daily calibration cycle is timed to minimise loss of ambient data.

Example of good auto-calibration data







HOWEVER



There have been a number of issues that have arisen when ratifying the data sets over the past couple of years. These have include:-

- Oxidised Cylinders
- Unstable Auto-Cals
- Gas cylinder running out generally related to recent problems with supply cylinder



What are the Consequences of poor calibration data?

- Unable to scale data properly
- Unable to identify analyser faults
- Unable to identify if the fault is with the analyser or cylinder
- Unable to ratify the data to the standards required

Possibly resulting in –

Deletion of Data

Example of oxidised cylinders





Example of unstable auto-calibrations





Example of no calibration data







How can we stop data being reject due to poor calibration data?

- Routine Manual calibrations.
- Communication between LSO's, Engineer Support units and QAQC unit.
 - Improvement in cylinder supply
 - 6 monthly service contract
 - Training for LA's





Questions?

Monitoring Issue: 2



PARTICULATE MATTER BASELINE CHECKS









• An on-going AURN study, carried out by AEA, has identified baseline offsets within some FDMS.

• Baseline checks of BAMs in the SAQD network also identified offsets in some analyser.

• The Majority of FDMS and BAMs within both studies were found not to have Baseline Offsets.



Example: FDMS baseline step change:



Example of BAM Baseline offset



Aberdeen Market Street 2 01/06/2010 to 31/01/2011

EA Δ





What can we do?

• AEA are proposing to include baseline checks within there QAQC procedures for both FDMS and BAM units within the Scottish Air Quality Database.

•This will include all 31 FDMSs and 10 BAMs in the SAQD



How will the Baseline checks be carried out?

• Using a DFU or HEPA filter over a set period of time to establish the analyser baseline.

(Agreement between HEPA tests and baseline responses have been good for all analysers tested to date.)

- Carry out at least 2 times a year
- Inline with the Intercalibrations carried out by AEA



What will these additional Checks provide?

- Improve data reliability
- Provide more information on the data measured
 - Help identify erroneous data quicker





What next?

Await decision from DEFRA and Scottish Government concerning the initial AURN study.

•If checks are implemented within AURN they will be mirrored in the SAQD.





Questions?





PLEASE CLEAN YOUR PM10 HEADS



AEA

David Hector AEA Glengarnock Technology Centre Glengarnock North Ayrshire KA14 3DD Tel: +44 (0)870 190 5269 Mob: +44 (0)7980798908 E: david.hector@aeat.co.uk W: www.aeat.co.uk

Copyright AEA Technology plc

This presentation is submitted by AEA. It may not be used for any other purposes, reproduced in whole or in part, nor passed to any organisation or person without the specific permission in writing of the Commercial Manager, AEA Technology plc.