Report on audits of organisations with MCERTS accreditation for manual stack emissions monitoring

Report 6: October 2013 – March 2014

1. Introduction

To help ensure the MCERTS scheme for manual stack emissions monitoring is delivering reliable, good quality monitoring results, we carry out a programme of audits.

The audits are carried out by Environment Agency monitoring specialists from the Emissions Monitoring team.

Auditing includes witnessing work taking place or assessing completed final monitoring reports. Where possible witnessed audits are carried out on an unannounced basis (that is the monitoring organisation is unaware an audit is going to take place). The audits of monitoring reports are split into two types, those that assess routine compliance monitoring and those that assess the calibration of continuous emissions monitoring systems using EN 14181.

2. Audits completed

The following audits were completed from October 2013 to March 2014:

Table 1: Number of audits completed

On site audits	Audits of reports	
	EN 14181	Compliance
17	6	4

3. Summary of audit findings and observations

3.1 On site audits

Health and safety

3.1.1 Risk Assessment not signed by all team members.

3.1.2 The risk assessment stated that a harness must be worn when lifting equipment up to the platform. The stack emissions tester did not wear a harness while doing this.

Isokinetic sampling for particulates and multiphase determinands

3.1.3 The Pitot and probe assemble were used to measure the diameter of the stack. One side of the Pitot opening looked to be slightly damaged.

3.1.4 No measurement device was available to carry out the swirl check.

3.1.5 The Pitot was detached from the probe after the traverse to attach the port adaptor. No leak check was performed after the Pitots were reattached.

3.1.6 The probe was inserted into the stack and left for five minutes to heat the filter housing up. The nozzle was facing into the flow during this period.

3.1.7 Blank post leak check was performed without the umbilical attached to the impinger train. The Level 2 responsible for the test reported this as a successful leak check.

3.1.8 Swirl test carried out using the wrong procedure.

Gas sampling with impingers or tubes

No issues

Gas sampling with analysers

No issues

Other

3.1.9 Trainees being left unattended to carry out traverse, swirl checks, setting up equipment etc.

3.1.10 No calibration information (stickers) for equipment used on site.

3.1.11 Calibration information on equipment with incorrect details.

3.1.12 Incorrect information on SSP.

3.1.13 The SSP stated that a measurement of O2 was required. This was not required because the results are not corrected for O2.

3.1.14 The nozzles were stored loose in a box, which may cause them to become damaged. The 6 mm nozzle appeared to have some damage around its edge. The nozzle ID numbers were not clearly visible.

3.2 EN 14181 audits

Findings:

3.2.1 Section 1B of the reports should include a statement to confirm that the calibration functions remain valid when no adjustments are made to the CEMs other than those permitted through QAL 3 (Ref MID 14181, Appendix 2, section 1B)

3.2.2 Various data sets have been omitted from the tables. For example: The sulphur dioxide testing does not report any SRM moisture results or CEM oxygen results. (Ref MID 14181, Appendix 2, section 4B, subsections B4.1 and B4.5)

3.2.3 The report has omitted a number of items listed in Appendix 2 of the 14181 MID.

Observations:

3.2.4 The table in section 2.1.7 of the report gives the daily average limits, however, the monthly limits have been entered instead.

3.2.5 The tables in section 4B.9 provided details of the valid calibrated ranges (VCR). Note that the VCR cannot be extended to twice the ELV for this type of installation. (Ref M20 section 3.9.2)

3.2.6 Executive Summary. The additional information provided at the foot of each page states that the valid calibration range for SO_2 is obtained from the QAL2, calculated using Method C linearity data; it therefore exceeds the daily ELV. Note that the valid calibration range when using Method C is based on the highest standardised SRM value from the original paired data plus 10%, and not from references gases used during the linearity tests.

3.2.7 The report author and the approver are the same person. Better quality control can be achieved if the report is approved by someone other than the author.

3.2.8 For the testing on unit 1 there are 14 results in the data set for NOx, but only 5 results in the data set for SO_2. Similarly, for unit 3 there are 13 results for NOx but only 5 results for SO_2.

3.2.9 The data plots on PLOT 2 do not correspond to the data provided in the Variability Test Data tables. Note that the data points for CAL CEM (Ref) appear incorrect.

3.2.10 For each determinand the report includes a description of the procedure used to identify outliers. It states that the method used is set out in the Environment Agency Monitoring Quick Guide 14 RM-QG14. The description refers to differences that are greater than 3 standard deviations. Note that the Quick Guide uses a limit of 2 standard deviations.

3.2.11 Section 4 suggests that the results from the particulate monitor should be used as qualitative. It would be advantageous to include an additional note in the executive summary to this effect.

3.2.12 The 'Raw SRM results' are given in ppm while the 'SRM results at CEM conditions' are given in mg/m^3. It is unclear how the latter results have been derived. The test house should check and confirm the conversion of results from ppm to mg/m^3.

3.2.13 Ammonia – The calibration function for ammonia refers to NO_2.

3.2.14 Sulphur Dioxide – Valid range and range extension. The extended range for SO_2 is quoted as the ELV. However, the figure given is 31.6 mg/m^3 rather than the ELV.

3.2.15 The uncertainties for NO_2 and SO_2 look high.

3.2.16 The certification levels for the monitoring team are unclear.

3.2.17 The information and tables - Most of the required data is present, but is not in the sequence specified in the template in Appendix 2 of the 14181 MID. (Note

that reports should follow the same numbering and sequence. See 14181 MID, Appendix 2, Foreword, page 27).

3.2.18 Various pieces information about particulates and SO_2 have been included in the report, but only NO_2 and O_2 have been subject to a QAL 2.

3.2.19 Plot 2 for oxygen shows a high level cluster. This would indicate the use of method B to derive the calibration function. The table on page 18 suggests that method A has been used. When selecting the calibration method, A or B, the concentration range should be taken as the difference between the highest and lowest standardised SRM result from the parallel tests under normal plant operating conditions. Note that zero surrogates should not be included in the spread of data at this point.

3.2.20 Plot 3 of standardised calibrated CEMs v Standardised SRM values should include parallel lines that indicate the derived uncertainty (σ_o) of the allowable 95% confidence interval of the daily ELV.

3.2.21 (For the attention of the operator) The Service Engineer's Report for the Procal analyser suggests that the instrument was calibrated during a routine service. This should only happen following an indication by the QAL 3 chart, or QAL 2 testing.

Review of results from the Functional Tests:

3.2.22 The linearity tests appear to use test gas concentrations of 20%, 40% etc of the span gas concentration rather than percentages of twice the ELV.

3.2.23 The values of Cu, as used in the linearity calculations, are incorrect. Note that Cu is equal to 2x ELV.

3.2.24 The linearity tests included an additional reference gas of approximately 100% of 2x ELV.

3.2.25 The functional tests appear to have been carried out 3 months before the monitoring. The monitoring was carried out on 25th to 29th November. The functional tests were carried out on 3rd August. The tests should be performed no more than one calendar month before the parallel reference measurements. (Ref MID 14181, section 6.2)

3.2.26 The functional tests appear to have been carried out several months before the parallel reference measurements. The parallel tests were carried out on 18th to 21st March 2013. The functional tests were carried out on 6th July 2012. The Functional Test Report has a date of 17th December 2012 (see Appendix IV). The functional tests should be performed no more than one calendar month before the parallel reference measurements. (Ref MID 14181, section 6.2)

3.3 Compliance reports

3.3.1 Blank results over 10% of the ELV.

3.3.2 Information specified in the MCERTS performance standard was missing from the monitoring report.

4. Summary

Based on the number of on-site audits completed (17), the number of findings and observations are low. This shows that MCERTS accredited organisations are providing good quality monitoring data. However, one audit did highlight poor quality work. Further audits of the organisation responsible for this work will be carried out, until we are satisfied with their performance.

There were a number of observations from our audits of EN 14181 reports. The varied nature of the observations shows that errors are not being made in one specific area. This indicates that there is no one specific area causing confusion.

5. Further information

If you require any further information about this report please contact Matthew O'Neill at matthew.o'neill@environment-agency.gov.uk .