Guidance on undertaking an Operator Monitoring Assessment

OMA

Industrial installations regulated under the Environmental Permitting Regulations

Emissions to Air

OMA Version 4
February 2013

Guidance on Operator Monitoring Assessment - Air

Contents

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1. Description of the Operator Monitoring Assessment Scheme

The Environment Agency introduced Operator Monitoring Assessment (OMA) in 2001 to strengthen its auditing of operators' self-monitoring arrangements. This applied initially to the monitoring of emissions to air from industrial installations regulated under the Environmental Permitting Regulations (EPR). OMA has since been extended to discharges to controlled water (including public sewers and groundwater) from EPR installations. In the longer term it is proposed to extend OMA to other media and regulatory regimes.

We will use the OMA scheme to:

- assess the quality and reliability of operators' self-monitoring (including monitoring undertaken on behalf of operators by contractors) as required by their permit
- identify monitoring shortfalls and potential areas for improvements
- review the monitoring conditions in the permit

An OMA report will be produced and a copy will be provided to the operator.

2. The purpose of the guidance

We will use this guidance when undertaking an OMA, to make an assessment of operators' self-monitoring arrangements in an objective and consistent manner. Although the OMA guidance is primarily intended for use by us, others may wish to use it, for example, when carrying out internal audits or in preparation for the Environment Agency OMA.

Detailed guidance on conducting an OMA is covered in Annex 1.

This guidance also explains the scoring system and how it is used to produce an overall OMA score for each EPR installation. OMA scores for air and water assessments will be recorded separately, even if they are conducted during the same visit. A separate document has been prepared for water monitoring.

3. Structure of the OMA scheme

The OMA scheme is divided into four sections as follows:

OMA 1	Management of monitoring
OMA 2	Periodic monitoring and test laboratories
OMA 3	Continuous monitoring
OMA 4	Quality assurance

Each of the four OMA sections contains a series of elements, against which we will score the operator's monitoring arrangements and record explanatory comments. The next sub-section describes how OMA assessors determine scores for each section of OMA.

4. Scoring

(i) Overview of the scoring system

Annex 1 provides detailed guidance to enable the score for each element to be determined. Scores should be recorded using the OMA report template. The report shall also record evidence gathered during the audit, reasons for the score for each element and details of actions to improve monitoring.

Each element will be scored 1, 2, 3, 4 or 5, with 1 being poor, 3 being acceptable and 5 being excellent. A score of 1 or 2 would usually require improvements to be made. “Not applicable” should only be used in exceptional circumstances and will require justification.

The guidance for each element gives example scenarios as guidelines for scores of 1, 3 or 5. A score of 2 or 4 should be given in circumstances that fall between the 1, 3 or 5 guidelines. A best-fit pragmatic approach should be taken when deciding on the scores.

The four sections contain different numbers of elements. The overall OMA score is the sum of the scores for all elements expressed as a percentage of the maximum total possible score. To allow comparisons between sections (to aid the identification of areas of weakness) the score for each section is also calculated as a percentage of the maximum possible score. All percentages are rounded up to the nearest whole number.

The following example explains the scoring system in more detail.

Assume the scores for the various elements of OMA 1 were as follows:

OMA 1 – Management of monitoring

Element	**Score 1 - 5**
A. Documentation of management system procedures for monitoring	1
B. Organisational structure for monitoring	5
C. Schedules and planning of monitoring, including contingencies	4
D. Monitoring records and use of monitoring data	3
E. Understanding the requirements of the permit and monitoring methods	2
TOTAL =	**15**

The OMA 1 score is calculated as:

actual score ÷ maximum possible score x 100%

OMA 1 has five elements. The maximum possible score is 5 (elements) x 5 (maximum score) = 25.

In this example the percentage score for OMA 1 is:

Actual score (15) ÷ maximum possible score (25) x 100.

OMA 1 score therefore = 60%.

The above process is repeated for each OMA section. The overall OMA score is then calculated as the sum of the scores for all elements expressed as a percentage of the maximum total possible score. For example:

Section	Total scores	Percentage scores
OMA 1	15/25	60%
OMA 2	10/35	29%
OMA 3	21/35	60%
OMA 4	12/30	40%
Overall OMA score	**58/125**	**46%**

It may be necessary for two or more different scores to be given for specific elements. Both scores should be recorded on the OMA report with explanatory comments. This procedure should be applied if the OMA includes, for example:

- a number of analysers
- more than one emission point (see section 6)
- in-house monitoring and contractor monitoring
- periodic or continuous and surrogate monitoring

(ii) Sections or elements that do not apply

If a section or element does not apply, then these elements and sections are excluded from the totals.

(iii) Changes in the scoring system

It should be noted that the structure of version 4 of OMA has changed significantly from version 3, the scores an operator achieves in version 4 cannot be meaningfully compared with previous scores in earlier versions.

5. Critical elements

All of the elements are important components of a monitoring regime. However, five of them are regarded as critical to monitoring, with low scores indicating critical flaws in the monitoring arrangements. Should a score of 1 or 2 be given for any critical element, then appropriate action should be taken to ensure that the identified shortcomings are addressed as a matter of priority.
The critical elements are:

- OMA 2A. Sampling provisions
- OMA 2C. Measurement methods and standards
- OMA 2D. Calibration methods
- OMA 3A. Provisions for monitoring and location of CEMs
- OMA 3C. Calibration methods

6. Multiple emission points

Some installations have multiple emission points. These sites may need an initial assessment, using a risk-based approach, to determine what emission points are assessed, for example, those with the highest potential impact on the environment. This will be an installation-based decision by the Environment Agency.

7. Health and safety

If issues are identified which could affect the health and safety of personnel, the operator should be informed immediately. If appropriate, the Health and Safety Executive should also be notified. In addition, relevant Environment Agency personnel should be informed.

8. MCERTS

We introduced our Monitoring Certification Scheme (MCERTS) to deliver quality environmental measurements. The scheme provides for the product certification of instruments, the competence certification of personnel and the accreditation of test house laboratories. In conjunction with Sira Test and Certification Ltd (http://www.siracertification.com/), we have established a register of certified systems. This includes details of equipment and test laboratories that meet the MCERTS standards. Details can be found via: www.mcerts.net .

9. OMA review

An OMA will be carried out at least once every four years. This frequency may be increased using a risk-based approach. Significant changes to the monitoring arrangements will require a review of the OMA. Deficiencies requiring improvement, identified during an OMA, should be reviewed on a continuing basis. Any deficiencies in monitoring with reference to the permit should be assessed according to the Environment Agency Compliance Classification Scheme.

10. Assessing Documented Procedures

Permits require the operator to have a documented management system; this means having procedures and work instructions which describe the processes to apply the permit conditions. This means therefore, that the operator must have documented procedures and work-instructions for all aspects of monitoring. When assessing these procedures, determine whether the operator has included all the ""W"s, i.e. the *what, when, who, where*, and *how* of monitoring.

11. Environment Agency contacts

If you have any questions regarding your OMA please contact your local Environment Agency contact or our Customer Contact Centre (0370 506 506). If you would like further information on the OMA scheme please contact:

Environment Agency
National Operations
Monitoring Certification Team
PO Box 519
Preston
PR5 8GD

Tel: 01772 714362
Email : richard.gould@environment-agency.gov.uk .

Or visit our web site at www.mcerts.net for the latest documents.

Annex 1: Detailed OMA guidance – emissions to air

The following detailed guidance should be used when undertaking an OMA of releases to air from EPR-regulated installations. The scope of the OMA should be clearly stated in the report, so that a systematic approach can be maintained for any OMA carried out in the future. For example, if the site is complex and has multiple processes, then the report must state exactly which processes and their releases were assessed.

OMA 1 - Management of monitoring

OMA 1 is intended to ensure appropriate commitment by the operator in providing adequate resources for monitoring. This commitment should be demonstrated across every level of the operator's activities, from policies produced at director level and the resources available to the understanding of the personnel responsible for monitoring and producing environmental data.

OMA 1 contains the following elements:

A. Documentation of management-system procedures for monitoring
B. Organisational structure for monitoring
C. Schedules and planning of monitoring, including contingencies
D. Monitoring records and use of monitoring data
E. Understanding the requirements of the permit and monitoring methods

Element	Qualification for OMA scoring	OMA score
Air OMA 1A **Documentation of management-system procedures for monitoring**	The operator has no procedures, or poorly written monitoring procedures. Procedures are not readily available to all relevant staff. There is no method statement available before work commences.	**1**
	The operator has effective and generally well written monitoring procedures. Procedures are readily available to all relevant staff. A basic outline method statement is available before work starting and the operator has established that this meets basic requirements.	**3**
	The operator has fully controlled, documented, comprehensive and up-to-date monitoring procedures. Documented procedures are formally issued to all relevant personnel and are controlled in an appropriate management system. A method statement is available prior to work starting and the operator has established that they fully meet requirements.	**5**

Scope
This element includes all of the operator's monitoring arrangements. Permits require operators to have a management system, which means documented and hierarchical procedures and work instructions. The management system must cover all aspects of monitoring, e.g. the management, maintenance and calibration of continuous monitors, arranging contracted periodic monitoring, periodic monitoring equipment, laboratory methods, surrogate methods, storage/transit of samples and treatment to prevent deterioration/changes to determinands.

Content of procedures
The procedures applying the management system should describe activities in detail and how they are to be carried out, for example, proper cleaning of equipment and sample inlets being kept free from fouling, blockage and corrosion. Procedures should cover maintenance and calibration of equipment in detail; a simple checklist is not sufficient.

Contracts
If samples are subcontracted to a third party for analysis, then the operator should specify the analysis that is to be performed; in the case of contractors working on site to carry out sampling and analysis, a more detailed method statement would be expected, such as a Site Specific Protocol (SSP) under MCERTS.

Element	Qualification for OMA scoring	OMA score
Air OMA 1B **Organisational structure for monitoring**	There is a poorly defined management structure for monitoring issues. Posts are not clearly identified as having responsibility for monitoring issues. There are inadequate resources available for monitoring.	**1**
	There is an acceptable management structure for monitoring issues. Monitoring is the responsibility of defined personnel. This is not documented in detail. Sufficient resources are normally available for monitoring.	**3**
	There is a well-defined and formally documented management structure for monitoring issues. Posts are clearly and formally identified as having responsibility for monitoring issues. Sufficient resources are always available for monitoring.	**5**

Documentation

A well-defined management structure may be demonstrated by:

- an overview procedure for compliance monitoring, including an organogram focused on monitoring and identifying roles and responsibilities for monitoring tasks
- provision for dealing with live monitoring issues
- inclusion in the management system of all staff involved in monitoring issues, for example, those involved in sampling, calibration and maintenance

As an example, we could expect to see a structure defining roles and responsibilities describing who is responsible for each task. Then we could expect procedures and work instructions to go into more detail, describing how the responsible person would perform a specific, defined activity. The format for this can be left up to the operator – the structure is sometimes perfectly well documented in a list of job titles and roles

Provision of a deputy

Operators should provide for business continuity when defining roles and responsibilities for monitoring; we need assurance that the operator will always have someone to fill a critical role. The provision of an appropriate “deputy” to take responsibility for the management of monitoring issues would be expected for a score of 3 or above.

Element	Qualification for OMA scoring	OMA score
Air OMA 1C **Schedules and planning of monitoring, including contingencies**	Monitoring schedules/plans are not produced, or are not adhered to. Rescheduling of missed samples does not take place Monitoring is not representative.	**1**
	Monitoring schedules/plans are produced for most aspects and they are adhered to. Invalid samples, missed samples and lost samples due to equipment failure are usually rescheduled in an appropriate manner. Monitoring is representative but the planning is reactive rather than proactive.	**3**
	Monitoring schedules/plans are produced for all aspects and they are adhered to. Invalid samples, missed samples and lost samples due to equipment failure are always rescheduled in an appropriate manner. There is a systematic and risk-based procedure to provide for representative monitoring and contingencies.	**5**

Schedule details

- A monitoring schedule should contain relevant information such as location, duration, frequency and date/time of monitoring. The schedule should account for site-specific considerations that may affect monitoring.
- Schedules should be available for calibration and maintenance of monitoring equipment. For continuous monitoring, there should be a system for scheduling calibration and maintenance of CEMs (continuous emission monitoring systems), including QAL2, AST and QAL3 processes (Quality Assurance Levels as defined in BS EN 14181) for WID (Waste Incineration Directive) and LCPD (Large Combustion Plant Directive) sites.
- For a high score to be achieved the operator should be able to demonstrate that the schedules are available to relevant staff.

Monitoring plans

An annual plan for monitoring needs to includes dates (approximate if not specific), determinands, locations, linkages to methods and procedures, and contingencies in case anything prevents the monitoring from taking place or if any monitoring needs repeating.

Batch processes

In circumstances where small-scale batch processes are production led it may not be practicable to precisely schedule monitoring in advance. However, there should be evidence that the operator has an effective means of ensuring the required number of samples and frequency of monitoring over the course of the year.

Site specific protocols (SSP)

MCERTS-accredited contractors must submit a SSP to the operator in good time before periodic monitoring takes place. The template for the contents required for a site specific protocol can be found in MCERTS *Manual stack emission monitoring – Performance standard for organisations,* available at www.mcerts.net .

Element	Qualification for OMA scoring	OMA score
Air OMA 1D **Monitoring records and use of monitoring data**	Monitoring results are not reviewed with a view to making improvements (for example, in process operation) to minimise emissions and environmental impact; or monitoring results are reviewed, but the operator does not act upon them.	**1**
	There are documented procedures for review. Monitoring results are reviewed and acted upon but the findings are not fully documented.	**3**
	There are documented procedures for review, with provisions for tracking trends, e.g. through control charts. Documentary evidence shows that monitoring results are reviewed and acted upon with a view to making improvements (for example, in process operation) to minimise emissions and environmental impact.	**5**

Examples of good practice

- The use of trend-plot analysis (such as control charts) to influence process operation.
- A review of results and compliance with permitted emission limits as a standing item on the agenda of appropriate operator management meetings.
- Review of results even if they are consistently below permitted emission limits.
- CEMs readings displayed in real time at the relevant reporting conditions specified in the permit. These readings should be displayed in an area visible to relevant staff such as those involved in controlling the process.
- Installation of “approach to limit” alarms on CEMs.

Note: We would expect operators to have provisions for validating the data before it is reviewed, so that only validated data is reviewed. OMA 4B covers the requirements for data validation.

Element	Qualification for OMA scoring	OMA score
Air OMA 1E **Understanding the requirements of the permit and monitoring methods**	The operator's personnel responsible for monitoring arrangements are unable to demonstrate understanding of monitoring requirements or methods. Monitoring requirements are not always implemented.	**1**
	The operator's personnel responsible for monitoring arrangements are able to demonstrate understanding of monitoring requirements and methods. Monitoring requirements are mostly implemented. There are training plans and assessments for the required competencies and capabilities	**3**
	The operator's personnel responsible for monitoring arrangements are able to demonstrate comprehensive understanding of monitoring requirements and methods. There are training plans and assessments for the required competencies and capabilities, strengthened by periodic reviews. Monitoring requirements are fully implemented.	**5**

Understanding of monitoring

- The score should reflect the practical understanding and experience demonstrated, for example, knowledge of MCERTS, monitoring methods, reference conditions, oxygen corrections, isokinetic sampling and quality assurance standards for CEMs, such as BS EN 14181.
- Attendance at relevant training courses and training records may be regarded as evidence.
- Personnel responsible for monitoring should demonstrate an understanding of how the process may impact on the environment.
- Guidance detailing the monitoring knowledge expected of personnel responsible for monitoring is available at: www.mcerts.net .

Contractors

The operator must understand monitoring requirements even if a contractor carries out all monitoring.

OMA 2 - Periodic monitoring and test laboratories

This section covers:

- Periodic monitoring equipment and surrogate methods.
- Sampling and automatic samplers.
- Sample storage and transportation.
- Laboratory methods and analytical equipment.

To obtain good quality monitoring data the sampling provisions, measurement method, equipment and techniques must be appropriate. Processes may have specific considerations that could impact on the fitness for purpose of the most robust method. Therefore, a degree of process-specific selection is required.

OMA 2 contains the following elements:

A. Sampling provisions *(Critical element)*
B. Certification of equipment
C. Measurement methods and standards *(Critical element)*
D. Calibration methods *(Critical element)*
E. Frequency of maintenance and calibration
F. Reliability of equipment (data availability)
G. Breakdown response
H. Traceability

Surrogate methods
In some cases it may be appropriate to use surrogate methods in place of determinand-specific monitoring of emissions. Examples of surrogate methods include:

- Calculation of mass emission rates using mass balances of production and waste figures, for example, calculation of sulphur dioxide emissions by analysing fuel for sulphur content and relating this to the amount of fuel used.
- Monitoring the emission by measuring a specific determinand and relating it to another determinand.

Surrogates may be used where the operator can demonstrate that they are based on proven principles backed up by empirical evidence, for example, comparison with a recognised method. Surrogate methods should be subjected to the same level of scrutiny under the OMA scheme as determinand-specific methods.

Element	Qualification for OMA scoring	OMA score
Air OMA 2A **Sampling provisions** **Critical Element: A score of less than 3 needs corrective action**	The sampling facilities are inappropriate, do not comply with Environment Agency requirements and do not provide for representative sampling with an acceptable degree of uncertainty. The sampling facilities are not demonstrably safe.	**1**
	Environment Agency requirements may not be met in all respects but the locations are technically the best available and provide representative samples with an acceptable degree of uncertainty. The sampling facilities are demonstrably safe.	**3**
	The sampling facilities fully comply with Environment Agency requirements. The sampling facilities are demonstrably safe.	**5**

Environment Agency requirements
Guidance is available on sampling location, planes and ports in Environment Agency Technical Guidance Note (TGN) *M1* - "*Sampling requirements for stack emissions monitoring"* available at: www.mcerts.net.

Importance of sampling facilities
Sample locations that do not comply with TGN M1 may result in monitoring deviations having to be made to standard methods. This reduces the quality of the monitoring and also affects the score for OMA element 2C Consideration should, as a minimum, include:

- location of the sampling planes and ports
- labelling of the sampling points
- condition and position of sampling lines and ports.
- compliance with flow criteria
- safe means of access, preferably stairs, self closing gates or safety chains above ladders
- the use of a permanent platform with platform inspection records or a heavy duty fixed tag scaffold that has been inspected
- the platform size requirements specified in TGN M1
- installation of lifting equipment, so that personnel do not have to lean over handrails in order to manoeuvre equipment onto platforms
- minimising exposure to stack gases by installing sample ports with access fittings that allow port adaptors to be fitted

High scores should only be awarded to sample locations and facilities that meet the above.

Gaseous emissions
The sampling plane location requirements for sampling gaseous emissions only are different from those for flow measurement and isokinetic sampling. Refer to TGN M1.

Element	Qualification for OMA scoring	OMA score
Air OMA 2B **Certification of equipment**	No monitoring equipment has certification for the relevant determinands and ranges even though such equipment is available.	**1**
	Some of the monitoring equipment has no certification for the relevant determinands and ranges even though such equipment is available.	**3**
	All the instrumentation has MCERTS certification for the relevant determinands and ranges where available.	**5**

When no MCERTS certification is available a maximum score of 3 may be given, although other evidence must be available to demonstrate suitability. In simple terms, this means test data on site to demonstrate that the equipment meets the performance requirements of applicable standards such as EN 14792 and EN 15058.

A score of 5 is applicable for MCERTS-certified equipment with an appropriate operating range. If the equipment is not MCERTS-certified the performance characteristics must be demonstrated.

If all the periodic monitoring is performed by an MCERTS-accredited test-laboratory with a valid scope of accreditation, then the score for this section will be 5 as the test laboratory has to used certified equipment where applicable.

Element	Qualification for OMA scoring	OMA score
Air OMA 2C **Measurement methods and standards** **Critical Element: A score of less than 3 needs corrective action**	The monitoring techniques are appropriate for the determinand of interest. There is significant interference from other species or process parameters. None of the determinands are monitored using standard methods, or the methods may be standard but not appropriate. There are significant deviations from the relevant method. The operator has no review process.	**1**
	The monitoring techniques are appropriate for the determinand of interest. The level of interference from other species and the sensitivity to any process parameter is acceptable. Some of the determinands are monitored using standard methods at the highest available level of priority in the hierarchy of standards. There are some minor deviations from the relevant methods. The operator has an informal review process.	**3**
	The monitoring techniques are appropriate for the determinand of interest with no significant interference from other species or sensitivity to any process parameter. All of the determinands are monitored using standard methods at the highest available level of priority in the hierarchy of standards. The relevant methods are complied with in full. The operator has a formal review process.	**5**

Guidance
Environment Agency Technical Guidance Note (TGN) *M2 – Monitoring of stack emissions to air* provides guidance and a hierarchy of standards. This and other monitoring guidance is available at www.mcerts.net .

Physical phase
Checks should establish that the required physical phases are being measured. Consideration should be given to the impact of abatement systems, for example, the introduction of water droplets by wet scrubbers requiring isokinetic sampling of certain gaseous species.

Range matrix and uncertainty
There should be evidence to show that the methods used are appropriate in terms of range, matrix and uncertainty.

Storage and transport
Any time lag between sampling and analysis will also have a bearing on whether the appropriate determinand is being measured. Many compounds degrade during storage and the operator should have considered storage conditions and transit times before analysis. Consideration should be given to the materials used in containers for sampling, storage and transportation.

In-house monitoring
Operators who use in-house staff and do not have MCERTS accreditation must demonstrate that they meet the requirements of the appropriate standard. If the operator is required to

monitor a substance not included in TGN M2, they must demonstrate that the method is fit for purpose.

MCERTS accreditation

If there is MCERTS accreditation for relevant determinands and methods this would indicate a score of 5.

Compliance with methods

Standard methods specify requirements that must be followed. Under MCERTS requirements monitoring contractors must state reasons if they have not been able to follow a method in full. For example, deviations from the method may be caused by a sampling location that does not allow access to all the required sampling points or does not have compliant flow criteria (see element 2A). Under these circumstances the operator should be scored three or less depending on the level of non-compliance.

Operating ranges

The operating range and uncertainty must always be checked. Ideally, the method should have a limit of detection and sample blank value of no more than 10% of the permit limit.

The meaning of a formal review

There should be a formal review process to ensure that the method remains fit for purpose. This means that the operator should have a systematic and documented process which demonstrates a review of monitoring methods and standards, and records the decision. This can take the form of:

- a documented procedure or process within a manual, work instruction or procedure
- allocated responsibilities; who does what, when and how
- documented actions that are required
- records of the review and decision, e.g. in minutes of meetings, on a template, or through emails

Whilst formal reviews may imply planned meetings with agenda and subsequent minutes, this may not be appropriate due to the nature of the task; for example, reviewing a permit or a contractor's proposed plan of monitoring against the standards in TGN M2 may be carried out by an individual or group of people when required, without holding a formal meeting, as long as the process is consistent, robust and documented.

Element	Qualification for OMA scoring	OMA score
Air OMA 2D	Sampling and analytical equipment are not calibrated to a minimum standard.	**1**
Calibration methods	Sampling and analytical equipment are calibrated using a satisfactory calibration method, but there is some room for improvement.	**3**
Critical Element A score of less than 3 needs corrective action	Sampling and analytical equipment are calibrated to a high standard. This means some form of verification, and stability checks performed in a pro-active manner. There is a much higher degree of monitoring and control of the instrumentation.	**5**

UKAS(United Kingdom Accreditation Service) **/MCERTS accreditation**
UKAS/MCERTS accreditation for all relevant determinands and methods would indicate a score of 5.

In-house monitoring
If the operator performs any in-house monitoring for air emissions, then we would expect to see QA/QC provisions equivalent to those in EN ISO/IEC 17025. This means a demonstration of accuracy and precision at the expected range of concentrations.

For the highest score, test laboratories would need to demonstrate that equipment for sampling and analysis is calibrated using methods which are traceable to national standards.

Element	Qualification for OMA scoring	OMA score
Air OMA 2E **Frequency of maintenance and calibration**	The frequency of maintenance or calibration is inadequate for the type of equipment and method.	**1**
	The frequency of maintenance and calibration is adequate for the type of equipment and method.	**3**
	The frequency of maintenance and calibration is demonstrated to give an added degree of confidence for the type of equipment and method.	**5**

Maintenance frequencies
The operator should have a schedule for maintenance for equipment, with the schedule defined by the supplier; the operator needs to provide evidence of this and adherence to the schedule. The operator also needs to have provisions for intermediate checks to ensure satisfactory continuing operation. These are the minimum requirements and will result in a score of 3. In order to get a higher score, the operator needs to demonstrate that preventative maintenance and checks are undertaken, and that statistical tools such as control charts are used to show that the equipment is still providing reliable data.

Accreditation
If the operator has UKAS/MCERTS accreditation for all the required determinands a score of 5 may be indicated.

Records
Documentary records of the frequency of calibration and maintenance should be checked.

Contracts
Documentary evidence is required for maintenance contracts let out to third parties for the operator's own test-laboratory equipment. A score of 1 will apply in the absence of documentary evidence.

Element	Qualification for OMA scoring	OMA score
Air OMA 2F **Reliability of equipment (data availability)**	The equipment is unreliable. Repeat analysis and/or rescheduling of samples due to equipment failures is required regularly.	**1**
	The equipment is reliable, with 95% availability. Repeat analysis and/or rescheduling of samples due to equipment failures occur at an acceptable rate of not more than 5%.	**3**
	The equipment is very reliable with over 95% availability Repeat analysis and/or rescheduling of samples due to equipment failures occur rarely.	**5**

Evidence
Evidence of equipment reliability can be provided by demonstrating that repeat sampling and analysis is rare.

We expect a 95% availability of all equipment. This means 19 measurements out of 20 can take place when needed. If equipment failures mean that an operator cannot take measurements at least 95% of the time when required, then the equipment is considered to be unreliable.

If the operator cannot provide documentary evidence a score of 1 may be given.

Element	Qualification for OMA scoring	OMA score
Air OMA 2G **Breakdown response**	No breakdown service is available. Spares are not readily available. The person(s) responsible for undertaking repairs is untrained and cannot demonstrate competence.	**1**
	A breakdown service will provide repairs within 48 hours. Spares are demonstrably available for delivery within 48 hours when the monitoring equipment is needed. The person(s) responsible for undertaking repairs is trained and competent, but training records are incomplete.	**3**
	A breakdown service will provide repairs within 24 hours. Spares are demonstrably available for delivery within 24 hours or equivalent duplicate equipment is available when the monitoring equipment is needed. The person(s) responsible for undertaking repairs is trained and competent and training records are fully documented.	**5**

Contracts
This also applies to maintenance carried out by third parties under contract.

Competence
A competent person would be an individual with relevant training in the appropriate equipment. Documentary evidence should be provided.

Spares and spare equipment
Any spares and duplicate equipment must be maintained and ready for use without significant delay, i.e. available when required.

Element	Qualification for OMA scoring	OMA score
Air OMA 2H **Traceability**	No documentary evidence of traceability of calibrations is available.	**1**
	Some, but not all, calibration parameters are traceable. Documentary records need improvement.	**3**
	Full and complete records are available demonstrating the traceability of all measurements to national or international standards.	**5**

Reference materials
Materials used for calibration purposes should be traceable to appropriate national/international standards. This should cover all standards and reagents whether purchased or prepared in-house. Traceability of fundamental mass, temperature and volume measurements in a laboratory should be demonstrated. Guidance on traceability can be found in TGN M2, and also M*eeting the traceability requirements of EN ISO/IEC 17025* – an analyst's guide and *EURACHEM/CITAG guide: Traceability in chemical measurement* at: www.nmschembio.org.uk .

Laboratory UKAS accreditation
For samples analysed in a laboratory, UKAS accreditation for the determinand would indicate a score of 5. In all other cases, it is the responsibility of the operator to provide documentary evidence that this requirement is being met. In the absence of documentary evidence a score of 1 will be given.

Laboratory balances (mass)
Laboratory balances should be housed in an area free of draughts, direct sunlight, heat sources and magnetic fields and should be supported on a surface that is not affected by vibration. They should have an annual maintenance by a third party organisation that includes calibration using certified weights traceable to the national standard. For best practice, daily calibration checks should be carried out using secondary standards that have been checked against a certified weight. Certificates of calibration should be available for inspection.

Pipette and burette (volume)
Many laboratories use mechanical pipettes and dispensers; these require servicing on a regular basis and frequent calibration checks. Records should be kept; each pipette should be labelled with a unique identity and date of current and next calibration. Volumetric glassware should be of at least grade B and kept clean.

Temperature measurement
Temperature control is important for many analytical procedures and needs to be monitored in ovens, incubators, fridges etc, with upper and lower limits.
Working temperature measuring devices should be checked at least annually against a standard thermometer traceable to a national standard. If calibration takes place in-house, a documented procedure should be used and results recorded. Where appropriate, corrections should be applied.

Use of MCERTS-accredited test-laboratories
If all the periodic monitoring is performed by appropriately accredited test laboratories, then the score for this section will be 5.

OMA 3 – Continuous monitoring

This section looks at sampling provisions, equipment certification, maintenance and calibration for continuous emission monitoring systems (CEMs).

Regular and appropriate calibration carried out on monitoring equipment increases the reliance that can be placed on the results. If operators utilise a MCERTS accredited test house with an appropriate schedule of accreditation it can be assumed that calibration of their equipment will be undertaken to an acceptable standard.

An example of an appropriate calibration is where results recorded by a CEM are statistically compared with results obtained from a periodic reference method.

This section also covers surveillance. Surveillance means a routine maintenance check of the concentration reading of a CEM against zero and span standard gases. For WID and LCPD sites, this is required by QAL3 of the quality assurance standard BS EN 14181. For other sites it would be in accordance with the relevant section on zero and span gases in Environment Agency Technical Guidance Note (TGN) *M2 – Monitoring of stack emissions to air*.

OMA 3 contains the following elements:

A. Provisions for monitoring and location of CEMs *(Critical element)*
B. Certification of CEMs
C. Calibration methods *(Critical element)*
D. Frequency of maintenance and calibration
E. Reliability of equipment (data availability)
F. Breakdown response
G. Traceability

Element	Qualification for OMA scoring	OMA score
Air OMA 3A **Provision for monitoring and location of CEMs** **Critical Element A score of less than 3 needs corrective action**	The monitoring facilities are inappropriate and do not comply with the Environment Agency requirements described in TGN M1. The position of the CEMs is not likely to provide for representative sampling and the operator can provide no evidence to support the premise that monitoring is representative.	**1**
	The Environment Agency requirements may not be met in all respects but the locations are technically the best available and provide representative samples. There is evidence available to show that the flow criteria specified by EN 13284-1 and the homogeneity requirements specified in EN 15259 are met.	**3**
	The sampling facilities fully comply with Environment Agency requirements specified in TGN M1, EN 13284-1 and EN 15259.	**5**

Environment Agency requirements
CEMs, whether these are cross-duct, in situ or extractive must measure at a point which is representative of the stack gas. This can be demonstrated through compliance with the requirements of TGN M1, which applies the standards EN 15259 and EN 13284-1. Considerations should include:

- location of the sampling points as agreed for compliance monitoring
- location of the sampling ports for parallel measurements when calibrating and verifying CEMS
- labelling of the sampling points
- condition and position of sampling lines and ports
- compliance with flow criteria
- homogeneity of gas concentration profiles
- safe means of access, preferably stairs, plus self-closing gates or safety chains above ladders.
- the use of a permanent platform with platform inspection-records, or a heavy duty fixed tag scaffold that has been inspected
- the platform size requirements specified in TGN M1
- installation of lifting equipment, so that personnel do not have to lean over handrails in order to manoeuvre equipment onto platforms
- minimising exposure to stack gases by installing sample ports with access fittings that allow port adaptors to be fitted

Gaseous emissions
The sampling plane location requirements for sampling gaseous emissions only are different from those for flow measurement and isokinetic sampling. Refer to TGN M1.

Element	Qualification for OMA scoring	OMA score
Air OMA 3B **Certification of CEMs**	CEMs not certified for the relevant determinands and ranges even though such equipment is available.	**1**
	The principal CEMs have MCERTS certification for the appropriate determinands, although some of the ranges may be higher than desired. There are CEMs for applications with no certified models available, but the operator can provide alternative evidence of suitability, such as verification by parallel reference methods, and supporting test data.	**3**
	All the CEMs have MCERTS certification for the relevant determinands and ranges. This includes peripheral as well as principal CEMs.	**5**

Applicability
This element applies to continuous emission monitoring systems (CEMs) for principal determinands and peripheral determinands.

MCERTS certification

When no MCERTS certification is available a maximum score of 3 may be given, although other evidence must be available to demonstrate suitability.

A score of 5 is applicable for MCERTS-certified equipment with an appropriate operating range. If the equipment is not MCERTS-certified the performance characteristics must be demonstrated.

Additional considerations
Assessment of the monitoring equipment should include all relevant factors that influence the result, for example, storage and retrieval of data.

For CEMs at LCPD and WID installations, if all the CEMs have MCERTS certification for the relevant determinands and ranges, a score of 4 is appropriate; a score of 5 can only be achieved if the data-recording software is also MCERTS-certified.

Element	Qualification for OMA scoring	OMA score
Air OMA 3C **Calibration methods** **Critical Element A score of less than 3 needs corrective action**	EPR installations other than WID and LCPD The CEMs are not calibrated to an acceptable standard There are no checks for stability, i.e. zero and span checks. There are no verification checks using parallel tests with a standard reference method (SRM). WID and LCPD installations WID and LCPD installations are not complying with all the requirements of EN 14181.	**1**
	EPR installations other than WID and LCPD The CEMs are calibrated using traceable gases or surrogates. WID and LCPD installations There are zero and span checks. WID and LCPD installations comply with the minimum requirements of EN 14181.	**3**
	EPR installations other than WID and LCPD The CEMs are calibrated using traceable gases or surrogates, and verified with parallel tests using a SRM and an applicable international standard, e.g. ISO 10155 for particulate CEMs. The operator performs zero and span checks, and manages the results using control charts WID and LCPD installations The operator goes beyond the requirements of EN 14181.	**5**

Gaseous Emissions
Calibration for gas-monitoring CEMs ideally consists of an initial set-up using test gases and then verification using parallel tests with a reference method. Then an operator needs to determine the stability of CEMs over time using zero and span checks.

EN14181
If the installation is subject to EN 14181, then the operator needs to apply the minimum requirements of EN 14181 to get a score of 3. Further guidance on this standard is covered in Environment Agency Technical Guidance Note (TGN) *M20 - Quality assurance of continuous emission monitoring systems - application of EN 14181 and BS EN 13284-2.*

Check that the operator has reviewed the EN 14181 reports and applied a calibration function if required.

Concentration levels
The OMA should establish that calibration is tailored to emission levels and permit limits. Check concentrations of span gases. These should approximate to the ELV or lie within a specific percentage range of the measurement range as stipulated by the relevant reference standard.

Element	Qualification for OMA scoring	OMA score
Air OMA 3D **Frequency of maintenance and calibration**	The frequency of maintenance or calibration is inadequate for the type of equipment.	**1**
	The frequency of maintenance and calibration is adequate for the type of equipment.	**3**
	The frequency of maintenance and calibration gives an added degree of confidence for the type of equipment.	**5**

Calibration frequency
After initial set-up of CEMs, parallel reference tests, if used, should be at least annual. Zero and span frequencies should be set at the maintenance interval stated on the MCERTS certificate.

QAL2 exercises should be performed at least every three years for WID installations, and at least every five years for LCPD installations. ASTs are performed annually in the interim years. Additional QAL2s are required when there are major changes to the process or CEMs.

Maintenance frequency
A manufacturer's manual for a CEM will describe all the necessary maintenance procedures, including scheduled services and checks. In order to get a score of 3, the operator needs to make sure that all the specified tasks in the manual are performed when required. In order to get a higher score, the operator needs to have additional preventative-maintenance procedures.

Records
Documentary records of the frequency of calibration and maintenance should be checked.

Contracts
Documentary evidence is required for maintenance contracts let out to third parties. A score of 1 will apply in the absence of documentary evidence.

Element	Qualification for OMA scoring	OMA score
Air OMA 3E **Reliability of equipment (data availability)**	Equipment is unreliable. For continuous monitors, valid results are produced less than 80% of the available time.	**1**
	Equipment is reasonably reliable. For continuous monitors, valid results are produced for at least 95% of the available time.	**3**
	Equipment is very reliable. For continuous monitors, valid results are produced more than 98% of the available time.	**5**

Valid result
A measurement demonstrated to be within a specific uncertainty.

Evidence
If an operator cannot provide documentary evidence a score of 1 may be given.

The availability can be checked by scanning data outputs; if there are any gaps, this is due either to the installation not operating or CEMs downtime. Ask the operator to give reasons and show records to explain any gaps.

MCERTS requirements
MCERTS requires a minimum availability of 95% for certification, so this is now the benchmark. Operators are only likely to achieve 100% availability if there are tandem CEMs, i.e. two on one stack.

Element	Qualification for OMA scoring	OMA score
Air OMA 3F **Breakdown response**	No breakdown service is available. Spares are not readily available. The person(s) responsible for undertaking repairs is untrained and cannot demonstrate competence.	**1**
	A breakdown service will provide repairs within 48 hours. Spares are demonstrably available for delivery within 48 hours. The person(s) responsible for undertaking repairs is trained and competent, but training records are incomplete. Or instead of a 48-hour contract, the operator has spare CEMs that can be installed and operating rapidly	**3**
	A breakdown service will provide repairs within 24 hours. Spares are demonstrably available for delivery within 24 hours or equivalent duplicate equipment is available. The person(s) responsible for undertaking repairs is trained and competent and training records are fully documented. The operator has tandem systems, i.e. hot standby CEMs: a 24-hour breakdown service contract is not required in this instance.	**5**

CEMs
A parallel set of fully maintained and calibrated CEMs would indicate a high score provided that a competent person(s) are available for installation.

Where the permit does not allow the process to operate if the CEM is non-operational this element can be regarded as non-applicable. Explanatory text should be included in the OMA report.

Contracts
This also applies to maintenance carried out by third parties under contract.

Competence
A competent person would be an individual with relevant training in the appropriate equipment. Documentary evidence should be provided.

Spares and spare equipment
Any spares and duplicate equipment must be maintained and ready for use without significant delay, i.e. available when required.

Element	Qualification for OMA scoring	OMA score
Air OMA 3G **Traceability**	The calibrations of CEMs cannot be demonstrated to be traceable. There are no documentary records of the calibration.	**1**
	Some, but not all, calibration parameters are traceable. Documentary records need improvement.	**3**
	The calibrations of CEMs are fully traceable to national or international standards. Full details of calibration are documented.	**5**

Factors to consider:

1) Span gases
2) Zero and span check records
3) Maintenance records
4) QAL2/AST test reports
5) QAL3 records

Reference materials

Materials used for calibration purposes should be traceable to appropriate national/international standards.

Calibration gases i.e. gases used to adjust the reading of the instrument must be traceable to EN ISO/IEC 17025 by third party accreditation from a nationally recognised accreditation body such as UKAS. Gases used to verify the drift of an instrument (for example, QAL3) must be stable but do not have to be traceable to EN ISO/IEC 17025 by third party accreditation. TGN M2 provides guidance on the performance requirements for test gases.

EN 14181

If the site is subject to EN 14181 and complies with all aspects of the standard, then the installation should achieve a maximum score if all actions are documented. Further guidance is available in TGN M20.

OMA 4 - Quality assurance

Quality assurance should include MCERTS accreditation and certification schemes, quality control (QC) schemes and auditing, complemented by an acceptable regime of reporting.

OMA 4 contains the following elements:

A. External quality control schemes
B. Internal data QC
C. Competence of monitoring personnel
D. Auditing of monitoring
E. Audit compliance
F. Reporting

Element	Qualification for OMA scoring	OMA score
Air OMA 4A **External quality control schemes**	The organisation carrying out sampling and analysis has no UKAS/MCERTS accreditation for any of the monitoring requirements. The organisation carrying out monitoring does not participate in any inter-laboratory proficiency testing scheme or carry out other external quality control activities. The operator's management system is not certified.	**1**
	The majority of sampling and analysis activities are UKAS/MCERTS accredited. The organisation carrying out monitoring participates in an inter-laboratory proficiency testing scheme and/or other external quality control activities. The operator's management system is certified, e.g. to ISO 14001 and/or ISO 9001. Monitoring procedures are within the scope of the management system.	**3**
	All monitoring activities are MCERTS accredited. The organisation carrying out monitoring participates in a recognised inter-laboratory proficiency testing scheme and other comprehensive external quality control activities. The operator's internal laboratory is UKAS accredited to EN ISO/IEC 17025.	**5**

UKAS accreditation
It would be expected that any sample sent off site for analysis should be analysed by a laboratory with UKAS/MCERTS accreditation for the determinand.

In the absence of UKAS/MCERTS accreditation and where the operator performs regulatory monitoring, any procedures used should be assessed. If they are acceptable then a maximum score of 3 will apply.

Accreditation schedules
Schedules of accreditation for accredited organisations are published on the UKAS web site. Such schedules list the methods and standards for which the test laboratory is accredited; they should be checked to ensure that all relevant methods are included. Accreditation schedules can be viewed at www.ukas.org .

Element	Qualification for OMA scoring	OMA score
Air OMA 4B **Internal data QC**	The operator does not perform any data validation.	**1**
	The operator reviews data for its validity but does not employ any rigorous checks for data integrity.	**3**
	The operator reviews all internal and external data for its validity, and employs rigorous checks for data integrity. The operator uses statistical tests and acceptance/rejection criteria for data.	**5**

Process for data validation
We need to see evidence that the operator is at least reviewing the data for its validity and taking any necessary actions if the data is not valid. Ideally there should be a systematic process and documented procedure for assessing data to determine whether it is sound and hence valid.

Capping of data
We need to know if operators have either a CEM or data-recording system which 'caps' the data. This means that the actual measurements could be exceeding either the measurement range of the CEM, or the recording range of the data-recording system. The ranges of both CEMs and recording systems need to be optimised so that all peaks are captured, without compromising the quality of the data by losing a significant amount of resolution.

Element	Qualification for OMA scoring	OMA score
Air OMA 4C **Competence of monitoring personnel**	Sampling and analysis personnel have no relevant training, qualifications or experience. No training records are kept. There is no monitoring training plan or procedure. There are no MCERTS-certified personnel in cases where the operator performs regulatory monitoring.	**1**
	Sampling and analysis personnel have some relevant training, qualifications or experience. Training records are in place but could be improved. There is a basic monitoring training plan or procedure. Internal monitoring staff are MCERTS-certified and there is at least one Level 2 on site or available.	**3**
	Sampling and analysis personnel have the appropriate level of training, qualifications and experience. Training records are comprehensive. There is a comprehensive monitoring training plan or procedure.	**5**

Laboratory UKAS accreditation
A laboratory holding UKAS accreditation to ISO/IEC 17025 or MCERTS for relevant determinands will satisfy the personnel competency requirements for analysis. Such laboratories will have ensured their personnel have received appropriate training and analysis is carried out under the supervision of a professional analytical chemist (for example, Chartered Chemist).

MCERTS personnel competency
The MCERTS personnel competency scheme is applicable to people who carry out manual stack emission monitoring. A Level 2 certified person with technical endorsements appropriate to the methods specified in the permit is required to approve the site specific protocol, lead the site work and approve the monitoring report. An individual's certification status can be confirmed by referring to their MCERTS certificate or identification card.

Guidance on the MCERTS Personnel Competency scheme is available at: www.mcerts.net

Training records
If monitoring personnel are certified to the appropriate level under MCERTS it is not normally necessary to check the training records or training plan.

Element	Qualification for OMA scoring	OMA score
Air OMA 4D **Auditing of monitoring**	No auditing procedures or audit plans are available, or the audit plan has not been complied with. No internal or external on-site audits have been carried out to check that the documented procedures are being followed by those conducting the monitoring.	**1**
	Auditing procedures are available. The audit plan does not cover all monitoring activities (management and technical). The person responsible for managing audits and closing out corrective actions is identified. Internal or external on-site audits have been carried out to check that the documented procedures are being followed by those conducting the monitoring.	**3**
	Fully documented auditing procedures linked to the management system are available. The audit plan covers all monitoring activities (management and technical). The person responsible for managing audits and closing out corrective actions is identified. Internal and external on-site audits have been carried out to check that the documented procedures are being followed. The operator audits test reports as well as contractors.	**5**

On-site auditing
On-site auditing refers specifically to assessing that the personnel carrying out monitoring do so in accordance with the agreed site-specific protocol and documented procedures. This element is not the routine audit of a management system during an ISO 9001 or ISO14001 audit.

Contractors
This should include contractors used for analysis and/or sampling.

Monitoring reports
Evidence of reviewing and auditing monitoring reports against the relevant standard would be expected for a high score.

Auditors
Auditors should be trained and qualified and independent of the activity being audited (independence may not be possible at small organisations)

Audit methods
The permit requires the operator to have a management system. Operators typically meet this requirement by having a certified management system. This has to include documented procedures for internal auditing, and the associated corrective and preventative actions. We expect the operator to apply these auditing procedures to their monitoring processes and procedures. The audits themselves may be compliance audits (e.g. 'tick boxes'), but preferably systems audits involving horizontal and vertical approaches.

Element	Qualification for OMA scoring	OMA score
Air OMA 4E **Audit compliance**	No audit records are available. Where audits show non-compliances, corrective actions have not been implemented.	**1**
	Audit records could be improved. Where audits show non-compliances, the reasons have been investigated and corrective actions have mostly been implemented.	**3**
	Audit records are comprehensive. Appropriate corrective actions have been completed in all cases. The effectiveness of the corrective actions has been investigated in all cases.	**5**

No audit carried out
If no audit has been carried out a score of 1 should be given.

Non-compliances
A simple numerical count of non-compliances and observations is a poor measure of overall compliance with procedures. The significance of the non-compliances is important and the OMA should consider whether they are major or minor.

Element	Qualification for OMA scoring	OMA score
Air OMA 4F **Reporting**	The contents of the monitoring report fail to meet the permit requirements and acceptable reporting standards. Reporting of data fail to meet the permit requirements.	**1**
	The contents of the monitoring report meet the permit requirements and in the most part meet acceptable reporting standards but further improvements are possible. Reporting of data meets the permit requirements.	**3**
	The contents of the monitoring report meet the permit requirements in all aspects and are to an acceptable reporting standard. Reporting of data is to a high standard providing additional confidence. This includes measures to cover physical tampering, archiving and auditing.	**5**

CEM data requirements
This should include measures to cover data security, archiving and security.

Reporting
Reports should be forwarded to the Environment Agency as specified in the permit.