

Continuous monitoring on landfill sites

Advantages of Continuous Monitoring Systems

We should encourage landfill operators to use continuous monitoring systems. Such systems, certified to our MCERTS performance standards (where available for the monitoring activity), properly installed, calibrated and maintained, provide much more information than spot samples or periodic measurements. In addition, this information is often available in real time, which helps operators improve the management of their processes to prevent or minimise pollution. Our approach to suspending CCS is explained in our note on monitoring frequencies and non-compliance reporting.

Application of Systems

To reduce the risks of uncertainty in the application of systems and subsequent data use, details of any system must be supplied by the Operator to us in advance of the use of the system or where data management is to be transferred from manual methods to continuous systems. Details must include system components and supplier(s); system performance standards; and calibration standards and procedures. The Operator must also identify other associated elements of management systems that may not be linked to the continuous monitoring system(s) (for example – leachate level monitoring wells that are still manually dipped).

Data Handling

Continuous monitoring systems produce significant quantities of data and it is important that this data is handled correctly. Typically, a continuous monitoring system will produce individual data points on a timescale from seconds to several minutes.

It is important to recognise that each of these data points should **not** be treated as a compliance result to compare against the permit limit, but each point provides data to form an average result over a specified time period. This is to be specified on a site specific basis in agreement with the local Area, based on the current minimum spot monitoring frequency identified in the permit. How we manage compliance and schedule 6 notifications is described below.

The averaging period would typically be daily, weekly or monthly, depending on the monitoring application and sensitivity of the receiving environment, but could be a shorter or longer time period depending on the specific application. For each application this time period **must** be specified in the permit, or if this means a permit variation is required, agreed in writing with the operator until the variation is issued, or the scheduled statutory permit review occurs.

Data Reporting

Routine data reports submitted by the operator in accordance with the permit shall include the following:

- the average result for the period; and
- the maximum result for the period; and
- a measure of the variability of the result (expressed as the 95 percentile confidence interval); and
- the availability of the monitoring system (expressed as a percentage of the time when data should have been produced); and
- reporting and justification of all data which has been removed as being either a false reading or an outlier.

We expect the availability of the monitoring system to be greater than 95%.

If the availability is less than 95% the operator should be required to report:

- steps taken to investigate the shortfall; and
- steps taken to avoid a recurrence.; and
- an estimate of the emissions during the period when monitoring was not taking place and the impact on the results.

Repeated failure to meet the 95% availability must be investigated formally and corrected.

Compliance Assessment and Schedule 6 notices

We must agree the Operator's mechanism for assessing compliance of the data set to the specified time period. Under historical permits, this time period has been typically monthly, but may vary from weekly to quarterly intervals subject to stability of the data set, the risks posed to the environment and the physical characteristics of site's design and management systems.

We recognise the benefits of automated statistical summaries from continuous monitoring systems. However, typical issues to be confirmed between the Operator and us include the date or period at which routine summary reports will be submitted (as specified in the permit), the compliance criteria for the summary data and the time period for issue of any Schedule 6 Notification that may arise from the process.

In response to the volume of data obtained from continuous monitoring systems over traditional manual spot measurements, revision of the facility's Contingency Action Plan may be required to reflect time and resources required to identify and examine the cause of any non-compliance.

Frequency of Reporting

Typically, the operator will submit summary data reports to us on a quarterly or six monthly basis and this will be specified in the permit.

Operators must be required to report data in graphical form as well, showing the real time data over the averaging period. This can be particularly useful to show variations and any developing trends.

As a minimum, real time data should be stored for a period of time and made available to us on request. This period of time should be specified in the permit. The default time period is normally four years.

Examples of continuous monitoring on landfill sites

Tables 1 to 4 below show examples of continuous monitoring as could be applied to landfills. These would be used to provide alternatives to currently available Schedule 4 tables of landfill EPR permits where appropriate.

Sources of further information

www.mcerts.net

TGN M2 Monitoring of stack emissions to air

TGN M18 Monitoring of discharges to water and sewer

Table 1 Point source emissions to air – emission limits and monitoring requirements

Emission point ref. & location	Parameter	Source	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
A1 [Point A1 on site plan in Schedule 2]	Oxides of Nitrogen (NO and NO ₂ expressed as NO ₂)	Landfill gas engine	xx mg/m ³	Daily Mean	Continuous	BS EN 15267-3 [Note 1]
A3 [Point A3 on site plan in schedule 2]	Sulphur dioxide	Landfill gas engine	200 mg/m ³	Hourly average	Continuous	BS EN 15267-3 [Note 1]

Note 1: certification to the MCERTS performance standards indicates compliance with BS EN 15267-3

Drafting note: the applicable monitoring standards are listed in TGN M2. Please ensure that the most up-to-date standard is cited in the table above.

Table 2 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements

Emission point ref. & location	Parameter	Source	Limit (incl. unit)	Reference Period	Monitoring frequency	Monitoring standard or method
W1 on site plan in schedule 2 emission to River Don	Total daily volume of discharge	Effluent Treatment Plant	60 m ³ /day	24-hour total	Continuous	MCERTS self-monitoring of effluent flow scheme

Drafting note: the applicable monitoring standards are listed in TGN M18. Please ensure that the most up-to-date standard is cited in the table above.

Table 3 Point source emissions to sewer, effluent treatment plant or other transfers off-site—emission limits and monitoring requirements

Emission point ref. & location	Parameter	Source	Limit (incl. Unit)	Reference Period	Monitoring frequency	Monitoring standard or method
S1 on site plan in schedule 2 emission to Sewage Treatment Works	Total daily volume of discharge	Site effluent treatment plant	60 m ³ /day	24-hour total	Continuous	MCERTS self-monitoring of effluent flow scheme

Drafting note: the applicable monitoring standards are listed in TGN M18. Please ensure that the most up-to-date standard is cited in the table above.

Table 4 Leachate level limits and monitoring requirements

Monitoring point reference/ Description	Parameter	Limit (incl Unit)	Reference Period	Monitoring frequency	Monitoring method or standard
PS001LM, PS002LM, PS003LM, PS004LM, PS005LM, PS006LM, PS007LM, PS008LM, PS009LM, PS010LM, PS011LM, PS012LM, PS013LM, PS014LM, PS015LM, PS016LM, PS017LM, PS018LM, PS019LM, PS020LM and PS021LM	Leachate Head	2.0m above top of liner	For 95% of all measured values of periodic samples taken over one month	Continuous (at 1 hour intervals)	<As set out in Operator Supplied Management Plan?>