

Policy Position Statement

Control of Odour

Purpose

To outline the main issues relating to odours arising from industrial premises, wastewater treatment plants, sewers and pumping stations, waste management facilities and agricultural activity, taking account of legislation, regulators, the public and other stakeholders and emerging best practice, particularly in a UK context.

CIWEM's Position on Odours

1. From time to time, members of the public in the UK are subjected to unpleasant odours (malodours) that are emitted from industrial premises, wastewater treatment plants, sewers and pumping stations, waste management facilities or agricultural activity. CIWEM considers that the operators of such facilities should work with regulators and the local communities to minimise such events through the application of appropriate controls. However communities and regulators must be aware that in many cases an odour free environment would be unsustainable (both financially and in terms of the wider environment).
2. The regulatory control mechanism for a majority of wastewater treatment works (WwTWs) are the Statutory Nuisance provisions of EPA 1990. CIWEM considers that this current control is now clear to both industry and regulators and this should lead to acceptable (and consistent) levels of control over odour from wastewater treatment works being required by regulators and achieved by operators.
3. CIWEM considers that, for wastewater treatment, the production of Codes of Practice (CoP) and Local Authority Guidance by Defra and the Scottish Executive (the latter CoP is a statutory document) and the technical reference and guidance documents provided by UKWIR form a sound basis for the future effective control and management of potential odour nuisance/annoyance through adoption of robust odour management plans (OMPs).
4. CIWEM considers that the Environmental Permitting (in England and Wales) and Pollution Prevention and Control (in Scotland and Northern Ireland) regulatory regimes, which apply to those premises and processes which have the greatest risk of causing odour nuisance and annoyance, aim to achieve an appropriate and proportionate level of control. The level of control applied is to achieve compliance with a standard of 'no significant pollution' as required by the Integrated Pollution Prevention and Control (IPPC) Directive.

5. With regard to the issue of encroachment between WwTW and residential areas, CIWEM considers that it is not possible to implement a blanket control over these issues; each case must be evaluated on its own merits. Recent experience with the adoption of 'consultation zones' has indicated that such an approach ensures all parties can work together from an early stage to ensure the opportunities for compatible land uses are maximised.
6. CIWEM considers that, when correctly applied, dispersion modelling of odorous emissions (quantified using olfactometry) represents the only accepted assessment technique. However, currently in the UK, there are no robust numerical statutory standards for assessing the acceptability of predicted odour impacts. Therefore, CIWEM considers that (in the absence of conclusive UK based research) the selection of the most appropriate odour impact criterion should be determined depending on both the objective of the assessment, the nature of the odour under assessment and the sensitivity of the affected local population, where this is relevant.

CIWEM is the leading independent Chartered professional body for water and environmental professionals, promoting excellence within the sector.

Context

From time to time, members of the public in the UK can be subjected to unpleasant odours (malodours) that are emitted from industrial premises, wastewater treatment plants, sewers and pumping stations, waste management facilities or agricultural activity. It is also possible that odours deemed to be of a pleasant nature can become intolerable after repeated exposure at high levels. Whilst members of the public can report nausea, there are not known to be any reliable examples of such odours at annoyance levels to cause direct health effects for human beings; they can impact upon residential amenity and result in the manifestation of a nuisance (a legal term); this can result in increased stress levels for sensitised individuals.

Legislative Framework

The legislation under which odours are currently controlled in the UK are as follows:

- ◆ Environmental Protection Act, (EPA);
- ◆ Town & Country Planning Act, (TCPA);
- ◆ Environmental Permitting Regulations (England & Wales) (EP); and
- ◆ Pollution Prevention and Control Regulations and Waste Management Licensing Regulations (Scotland and Northern Ireland) (PPC)(WML)

The EPA applies to all business and trade premises, including wastewater treatment assets, industry, agriculture and waste management. However, where activities are also regulated in law under the EP (or PPC & WML Regulations in Scotland and Northern Ireland) or by conditions imposed upon a planning permission, there will commonly be a legal and procedural debate as to which piece of legislation should take precedence.

(Note the IPPC Directive has recently been recast into the Industrial Emission Directive and will be implemented in the UK, this will not affect the overall controls).

Statutory Nuisance

In England, Scotland and Wales, under the EPA, local authorities have a duty to carry out regular inspections of their areas to determine whether an odour nuisance exists or is likely to re-occur (Public Health Act 1878 (as amended) in Northern Ireland). This can be as a result of local authority action following complaints by affected members of the public or from local authority officers' observations. Where the authority is satisfied that a 'nuisance' exists or will arise again (odours tend to be transitory in nature), it has a duty to issue a Notice (an Abatement Notice), requiring the owner/operator of the premises or process to abate the nuisance within a specified time period.

Recent legal cases have highlighted the difficulties and uncertainties with the application of this regime and promoted the publication of CoPs by DEFRA (voluntary) and the Scottish Executive (statutory) which identify the principles of minimisation and control of odour at WwTWs and recommend the development of site-specific Odour Management Plans (OMPs).

A possible defence on appeal against an Abatement Notice is that the owner/operator is applying "Best Practical Means" (BPM) to minimise odour emissions in operating the process. The term BPM is defined as:

- (a) "Practicable" means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications;
- (b) The means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures;
- (c) The test is to apply only so far as compatible with any duty imposed by law;
- (d) The test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances;

It should be noted that, where an operator can demonstrate that BPM is being applied, or where an agreed degree of abatement deemed to be BPM is added, this will not necessarily result in the total elimination of odours.

Planning

Under the TCPA, where planning applications for developments with the potential to give rise to odorous emissions are made, the planning authority has a duty to make an assessment of the proposed development in relation to adjacent land uses. If it considers that the potential to cause a loss of amenity for nearby residents exists, then Conditions may be imposed upon any Planning Permission granted, in order to achieve control over odours and prevent significant loss of amenity.

The issue of encroachment of development (often residential) towards existing industrial facilities with an odour impact causes difficulties. The application of 'cordons sanitaire' which

seek to restrict development of incompatible land usage near to odour sources, can conflict with the requirements of PPS23 and other guidance. Whilst no formal guidance is available, recent experience shows that the definition of 'consultation zones' in the Local Development Framework (LDF) process can ensure that such issues are identified at an early stage and used to inform developers, local authorities and land-purchasers of suitable land-usage.

Where incompatible land uses are proposed, a commonly applied solution is for the developer to contribute to the provision of additional odour control or minimisation at the source. Such an approach has been used on numerous sites; however, it is not the preferred approach as it places a long-term operational, maintenance and replacement cost (including energy consumption) on the operator of the facility.

Environmental Permitting and PPC

Premises and processes regulated under this regime are required to minimise emissions to atmosphere, including odours, to achieve a standard of 'no significant pollution' by applying Best Available Techniques (BAT). The regime, regulated by the

Environment Agency/Scottish Environmental Protection Agency (SEPA)/ Northern Ireland Environment Agency (NIEA) (for the larger and more complex installations) and local authorities (for the smaller, less polluting installations), applies to some wastewater treatment installations (where sludge treatment or industrial wastewater treatment is carried out).

Operators of the installations have to apply for a Permit to operate, which contains, typically, a range of conditions requiring certain controls to be imposed that achieve BAT. Regular inspections and monitoring are conducted by the regulatory body to ensure that BAT is being applied.

Specifically for odours, the Environment Agency has issued a draft Horizontal Guidance document (EP H4) that explains the requirements for, regulation and control and abatement of odours from Permitted installations and processes. The NIEA uses an earlier consultation draft of the H4 guidance (from 2002), whereas SEPA has published final guidance in its '2010 Odour Guidance' document. Whilst having some differences, all documents identify the key stages in odour reduction and minimisation, through appropriate design and operation, and endorse the use of OMPs.

Waste Management Licensing (Part II of EPA 1990) – Scotland and Northern Ireland

Premises and processes regulated under this regime are required to ensure waste is recovered or disposed of without using methods which cause nuisance through odours.

Private Nuisance under common Law

Whilst the Statutory Nuisance Regime allows a defence of BPM, and the EP/PPC Regimes do not require measures beyond BAT, it should be noted that claims for private nuisance (which are ongoing against several WwTW sites in the UK) under common law are assessed against a standard of "unreasonable interference with a landowners use of their land". In order for a private nuisance to be actionable, the impact must be either (a) intentional (or reasonably

foreseeable) and unreasonable or (b) unintentional but caused by negligent, reckless, or abnormally dangerous conduct."

Clearly, strict adherence to the requirements of the DEFRA CoP and application of BPM/BAT though a thorough OMP will assist in demonstrating that the operator is not being negligent. The unreasonableness of any residual impact on the local area will be judged (by the courts) on a case by case basis and recent judgements have indicated that the duration, frequency and intensity of exposure will be key factors and that individuals will have to clearly demonstrate to what degree this has impaired their enjoyment of the land when claiming for damages.

Summary of Legislative Control

In summary, facilities regulated under the EP/PPC regimes are subject to a rigid form of control and installations included are industry and the highest-risk waste management, wastewater treatment and agricultural premises. Sites not regulated under EP/PPC may or may not have the odour regulated by Planning Conditions, depending upon the situation at the time of grant of planning permission.

Those that are not controlled by the above would be subject to the Statutory Nuisance provisions of EPA 1990 (although EP/PPC sites are still subject to EPA 1990 controls) and, indeed, Private Nuisance under Common Law.

Odour Impact Criteria and Dispersion Modelling

Dispersion modelling of odorous emissions to ascertain the extent of off-site impact represents a widely accepted method of assessing potential risk of unacceptable impacts when correctly applied. This technique allows the comparison of changes to the sources of odour (i.e. likely improvement to be achieved by mitigation works) and the likely acceptability of different land uses.

Odour Impact Assessment Overview

Environmental odours are typically the result of a complex mixture of chemicals. Therefore Odour assessments are undertaken using the concept of the European Odour Unit (ouE), as defined in BS EN 13725. This approach allows impact assessment of any odorous gas as it is independent of chemical constituents and centres instead on multiples of the detection threshold (i.e. the physiological response of a human) of the gas in question. The notations used in odour assessment are as follows:

- ◆ Concentration: ouE/m³;
- ◆ Emission: ouE/s; and
- ◆ Specific emission (emission per unit area): ouE/m²/s.

To assess the extent of odour impact from a facility, the odour emissions are quantified (from either library or site specific data) and input to an atmospheric dispersion model which predicts hourly average impact at receptors locations for every hour for a 5-year dataset.

Odour Impact Criteria

Exposure to odour is assessed in terms of a percentile of averages over the course of a year. This prevents results being skewed by infrequent meteorological conditions and acknowledges that some odour being detectable on calm/foggy days is unlikely to cause long-term annoyance. The exposure criteria most accepted in the United Kingdom (UK) at present is given in terms of (concentration) European Odour Units as a 98th percentile (C_{98}) of hourly averages. This allows 2% of the year when the impact may be above the limit criterion (175 hours). The notation for impact is therefore: $C_{98, 1\text{-hour}} \times \text{ou}_E/\text{m}^3$. It is therefore evident that such criteria apply only to locations where an individual's exposure is likely to occur for prolonged periods of time i.e. residential properties. Where exposure is more transient i.e. roads, footpaths etc the direct application of such criteria should be treated with caution.

Currently, in the UK there are no numerical statutory standards for assessing the acceptability of these predicted odour concentrations. On this basis, a variety of differing odour impact criteria have developed from guideline documents (predominately based on research from outside of the UK), case law and research. Furthermore the differing regulatory regimes aim to achieve differing standards i.e. no nuisance (EPA), preserve amenity (TCPA), no significant pollution (PPC), no nuisance (WML). This has led to confusion for regulators and process operators alike.

The main source of research into odour impacts in the UK has been the wastewater industry and the most in-depth study published in the UK of the correlation between modelled odour impacts and human response (dose-effect) was published by UK Water industry Research (UKWIR) in 2001. This was based on a review of the correlation between reported odour complaints and modelled odour impacts in relation to 9 wastewater treatment works in the UK with ongoing odour complaints. The findings of this research (and subsequent UKWIR research) indicated the following:

- At modelled exposures of below $C_{98, 1\text{-hour}} 5\text{ou}_E/\text{m}^3$, complaints are relatively rare, at only 3% of the total registered;
- At modelled exposures between $C_{98, 1\text{-hour}} 5\text{ou}_E/\text{m}^3$ and $C_{98, 1\text{-hour}} 10\text{ou}_E/\text{m}^3$, a significant proportion of total registered complaints occur; 38% of the total;
- The majority of complaints occur in areas of modelled exposure greater $C_{98, 1\text{-hour}} 10\text{ou}_E/\text{m}^3$, 59% of the total.

The $C_{98, 1\text{-hour}} 5\text{ou}_E/\text{m}^3$ impact criterion has since been accepted as being appropriate in a number of WwTW planning applications for avoidance of significant risk of annoyance and a low risk of nuisance (e.g. Newbiggin, JS Bloor Ltd Leighton Linlade, etc).

The Environment Agency has published a number of draft guidance documents relating to odour assessment. These included the Horizontal Guidance Notes H4 Parts 1 and 2 (adopted by NIEA and used as basis for 2010 Odour Guidance by SEPA), which were released for consultation in 2002. These have now been withdrawn and replaced by guidance EPR H4 – Odour Management.

The draft H4 Guidance and NIEA and SEPA PPC odour guidance documents propose indicative criteria of between $C_{98, 1\text{-hour}} 1.5\text{ou}_E/\text{m}^3$ and $C_{98, 1\text{-hour}} 6\text{ou}_E/\text{m}^3$ as a starting point before adjustments for local factors are made, dependent upon the relative offensiveness of the source. It is important to note that these criteria are specific to the EP/PPC Regime and relate

to a standard of 'no significant pollution' as required by the IPPC Directive. SEPA also state that they consider the requirements of PPC (no significant pollution) and WML (no nuisance) to be comparable.

Odour Impact Criteria – CIWEM's Position

Given the differing odour impact criteria available, the selection of the most appropriate criterion should be determined by the objective of the assessment (whether this be against a standard of avoidance of nuisance or 'significant pollution') and the nature of the odour under assessment.

It is, therefore, the view of CIWEM that these and other odour impact criteria should be regarded as indicative guidelines and cannot be applied as over-arching statutory numerical standards. CIWEM considers that the following framework is the most reliable that can be defined on the basis of the limited research undertaken in the UK at the time of writing:

$C_{98, 1\text{-hour}} 10\text{ou}_E/\text{m}^3$ - complaints are highly likely and odour exposure at these levels represents an actionable nuisance;

$C_{98, 1\text{-hour}} 5\text{ou}_E/\text{m}^3$, - complaints may occur and depending on the sensitivity of the locality and nature of the odour this level may constitute a nuisance

$C_{98, 1\text{-hour}} < 3\text{ou}_E/\text{m}^3$, - complaints are unlikely to occur and exposure below this level are unlikely to constitute significant pollution or significant detriment to amenity unless the locality is highly sensitive or the odour highly unpleasant in nature.

Recommendations

It is CIWEM's opinion that much of the uncertainty relating to odour is a result of a lack of focused and collaborative research over recent years which has meant that guidance and policy cannot be definitive. CIWEM therefore strongly supports the following which will assist in providing the reliable data upon which more robust guidance and policy can be developed:

Water Service Providers collaborate to review the odour emission data collected from their sites in order to provide a realistic data set from which to predict the odour emission rates from proposed works;

A robust procedure for the dispersion modelling of odours be adopted by the relevant industries (wastewater treatment, waste, food industries etc.) supported by the Government and based on the recommendations of the EA, Irish EPA and NZ Ministry for the Environment, to minimise the differences that can occur between different practitioners;

Further targeted research undertaken in the UK by the relevant industries funded by the Government to define a reliable dose-effect relationship between prediction of odour impact models and community annoyance; and

This study should also consider how the overall sustainability of mitigating odorous impacts can be more robustly quantified to ensure that proposed abatement plant fully meets the requirements of BPM and BAT.

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Note: CIWEM Policy Position Statements (PPS) represents the Institution's views on issues at a particular point in time. It is accepted that situations change as research provides new evidence. It should be understood, therefore, that CIWEM PPS's are under constant review, that previously held views may alter and lead to revised PPS's. PPSs are produced as a consensus report and do not represent the view of individual members of CIWEM.