

Frequently asked questions

Landfill Sites

Last updated: 30 January 2020

The Environment Agency regulates the Environmental Permits held by a landfill operator. Within the permits there are conditions controlling the operations which the sites can carry out including waste types, amounts, construction and design of the site, emissions limits and location and frequency of environmental monitoring. For example for groundwater and surface water.

The permit conditions are designed to prevent pollution and minimise impacts to the environment and human health. Appropriate preventative measures are required to be taken through the application of best practice. The Environment Agency produces landfill sector technical guidance which details best practice.

These frequently asked questions (FAQs) are relevant for all landfill sites. Copies of Environmental Permits for individual sites contain site specific information. These permits are public register information and can be requested from us.

The purpose of these FAQs is to provide a response to commonly asked questions. We will update these FAQs as and when we receive questions that can be addressed generically.

Contents

[1 Odour](#)

[2 Health](#)

[3 Landfill design](#)

[4 Traffic](#)

[5 Miscellaneous Controls](#)

[6 Public Register](#)

[7 Environment Agency Contacts](#)



1. Odour

No operational landfill will ever be completely odour free, this is mainly due to the nature of waste materials and the operations and processes that occur on site. However, the level and type of odour arising from such operations should not be causing pollution beyond the site boundary.

Environmental Permit conditions require an Environment Agency officer to make a judgement about whether odour beyond the site boundary is considered pollution. Our officers assess the specific circumstances and determine whether the receptor (individual) might find that the odour is causing pollution.

Pollution is defined in Regulation 2 of The Environmental Permitting (England and Wales) Regulations 2016 (other than for a water discharge or groundwater activity) as “an emission which may be harmful to human health or the quality of the environment, cause offence to a human sense, result in damage to material property or impair or interfere with amenities and other legitimate uses of the environment.”

Environment Agency officers carry out odour checks. When we substantiate pollution beyond the site boundary and determine that the operator is not taking appropriate measures, we score this according to our Compliance Classification Scheme (CCS) guidance.

<https://www.gov.uk/government/publications/assessing-and-scoring-environmental-permit-compliance>

Repeated substantiated odour breaches may result in escalation, particularly when no improvement plan is proposed by the operator. We have a range of regulatory powers that we can use, including taking legal action. We require any site that we regulate to be well run and managed, and not cause harm to the environment or human health. If we agree an action plan with the operator to address the problem, this does not mean we have ruled out taking enforcement action. Our focus will always be to ensure any issues are resolved as quickly as possible. Any enforcement response we take will be in accordance with our published Enforcement and Sanctions guidance which you can find on our website. See link below

<https://www.gov.uk/government/publications/environment-agency-enforcement-and-sanctions-policy>

The operator is informed about complaints, but we don't release personal data so they cannot identify complainants. The operator is expected to respond to complaints regarding odour in accordance with the Odour Management Plan for the site, and to advise us of any resulting changes to their operations. We will also seek feedback from the operator.

How do individuals' levels of sensitivity to odour differ?

There will be a wide range of sensitivities within a general population. It is important that the concerns of individuals who are highly sensitive are not dismissed.

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Olfactory sensitivity is a person's sensitivity to odour and is predominantly determined by physiology, as each person is born with a level of sensitivity to odour that varies from person to person. There will be natural fluctuations in a person's sensitivity during the day. A number of factors such as age, emotional states such as being annoyed or distracted, having a common cold or eating certain foods can reduce your sensitivity, whereas exercise can heighten your sensitivity.

Odour detection is a complex and multistage process. Most senses identify what it is that we are tasting, seeing, hearing or feeling. Odour is different because it is processed by a different part of the brain, the limbic system, which deals with memory and emotion. When we smell something, our first reaction is whether we like or dislike the odour and then what it smells like, or reminds us of. This means that people have an emotional response to odour based on their experiences and an odour that one person finds offensive may not be offensive to another person who has a positive association with that particular odour, even if it is normally considered unpleasant.

Some people will be tolerant of odours at high intensities while others will be unable to tolerate an odour as soon as they identify it, so there are also a range of sensitivities to annoyance. There are a number of factors that could influence this, including having to cancel barbecues, inability to enjoy gardens or inability to hang washing out. Sometimes the sensitivity to annoyance can be confused with odour intensity and it is important to recognise this because it can be an indicator of the level of pollution.

How do the Environment Agency assess odour?

Assessment of odour is a dynamic process determined by site specific and weather conditions. We use an assessment process designed to provide as much information as possible. The 'FIDOR' acronym - Frequency, Intensity, Duration, Offensiveness and Receptor Sensitivity - is a useful reminder of some factors that will influence the degree of odour pollution.

We record odour intensity on a scale of 0 to 6 as follows:

- 0 – No odour
- 1 – Very faint odour (need to inhale into the wind to smell anything)
- 2 – Faint odour (you can detect an odour when you inhale normally)
- 3 – Distinct odour (there is clearly an odour in the air as you leave your car or enter the area)
- 4 – Strong odour (a bearable odour but strong, you could stay in the area for some time)
- 5 – Very strong odour (unpleasantly strong, you will want to leave the area quickly)
- 6 – Extremely strong odour (likely to cause nausea and a strong need to remove yourself from the odour immediately)

An operator will not be in breach of the odour condition in their environmental permit when they cause odour pollution beyond the site boundary, provided they are using all appropriate measures. However, even if the operator is using all appropriate measures but we consider the residual odour is at such a level that it is unreasonable, it will be necessary for the operator to take further measures to reduce odour pollution, or risk having to reduce or cease operations if appropriate. Where the residual odour pollution is, or is likely to be, unacceptable we will work closely with operators to require them find solutions.

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What are the likely sources of odour at a landfill?

Odour sources from a landfill include leachate, landfill gas, newly deposited materials and delivery vehicles.

As part of a site's Odour Management Plan they will complete daily checks of their site to monitor for odours. Where an odour is detected it is important to determine the source. Different sources of odour require different actions to reduce emissions.

What measures are in place to minimise the odour at a landfill site?

Measures to minimise odour commonly include the following. This is not an exhaustive list, there are other measures which can be used on a site by site basis:

- Capturing landfill gas and combusting it using a landfill gas engine or flare;
- keeping the tipping area as small as possible;
- covering waste as soon as possible;
- installing capping over the waste when operational areas have been completed;
- ensuring the landfill gas management system is operating effectively and installed once gas is being produced

2. Health

What is landfill gas and is it harmful?

Landfill gas is the principle component of emissions to air from landfill sites. Landfill gas is produced once the biodegradable waste that is deposited in a landfill, decomposes and breaks down.

The composition of the gas varies according to the type of waste and phase of its decomposition, but typically contains a large proportion of methane, (around 60% to 65% by volume) and carbon dioxide (around 35% to 40% by volume). It also contains a number of other 'trace' gases present in very small quantities (around 1% in total), such as organic gases or vapours.

Some of the trace chemicals are very strong smelling and can be detected by the human nose at extremely low concentrations. Hydrogen Sulphide is a trace gas that causes the 'rotten eggs' smell. Hydrogen Sulphide can be smelt at much lower concentrations than the level that can cause harm. Whilst it may still be possible to smell Hydrogen Sulphide (rotten eggs) in the air around landfill sites, it would have undergone significant dilution and would be very unlikely to directly impact human health.

The control measures used by the operator are designed to ensure that these substances are not emitted from the site above the concentrations which could cause harm. Environmental Permits for landfills require the operator to monitor and report the effectiveness of the control measures as they are installed and for the life of the site.

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For example:

- Carbon Monoxide is monitored in the stack (chimney) emissions from the landfill gas power plant and flare. It is used as a measure to ensure that the landfill gas is fully destroyed.
- The gas management system is used to collect and destroy Methane, Hydrogen Sulphide together with the other trace gases.

How do you detect if landfill gas is escaping from a landfill?

Can Hydrogen Sulphide drop to the ground and accumulate at the bottom of a hill?

Landfill gas, including the trace component of Hydrogen Sulphide, may be emitted from the surfaces of a landfill. We call these fugitive emissions. Landfill sites complete surveys of the site surfaces to monitor for fugitive emissions. Action will be taken when fugitive emissions are detected, to increase gas extraction, improve and/or repair capping or install additional gas collection wells.

Fugitive emissions of landfill gas, including the trace component of Hydrogen Sulphide, will dilute and disperse in the air and move with the wind. Under still weather conditions landfill gas will still dilute in the air but is less likely to disperse. As the human nose can detect hydrogen sulphide at very low levels it may still be detectable after being diluted. In areas which are protected from the wind landfill gas is less likely to disperse quickly and therefore it is more likely to be detected (smelt) by residents.

How we consider health impacts as part of our regulation

When making decisions on the risks from landfills we regulate, we consult Public Health England (PHE), formerly the Health Protection Agency (HPA) and follow their advice and guidance.

They produced a report (RCE-18) which was published in 2011 and concludes that living close to a well-managed landfill site does not pose a significant risk to human health. The report encompasses the results of a number of epidemiological studies, detailed monitoring results from a major project funded by the Environment Agency, and advice sought from the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment.

You can read more about the impact on health from landfill site emissions in the report here: <https://www.gov.uk/government/publications/landfill-sites-impact-on-health-from-emissions>.

Whenever people are concerned about their personal health, they should visit their General Practitioner (GP) or contact NHS Direct on 0845 4647 or www.nhsdirect.nhs.uk.

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Our sources of advice and guidance on health impacts

At sites that we regulate, we have a statutory requirement to protect the environment and safeguard people's health. We frequently respond to incidents that could potentially lead to risks to human health. We seek advice and information from health professionals to inform any decisions we make during our incident response. Similarly, sometimes health professionals will need advice from us on environmental circumstances that affect their role in health protection. It is important to note, that it is not our role and we are not qualified to give health advice to the public.

A guide to roles and responsibilities

Public Health England (PHE) is an executive agency of the Department of Health. It provides a technical support service to Government, Government bodies, local authorities and the public. For example,

- Independent, expert advice on health risks;
- Interpretation of monitoring data in relation to health; and
- Support for public communications about health risks.

Further information can be found at the link below:

<https://www.gov.uk/government/organisations/public-health-england>

Environmental Health is a department within a Local Authority. They have statutory duties within their authority boundaries including:

- Regulating smaller industrial processes;
- Producing local air quality management plans including monitoring and assessment;
- Statutory nuisance – noise, gas, smoke, dust, odour and insects.

Environment Agency lead for our regulated sites and are supported by Environmental Health Officers (EHOs) where relevant to their role. EHOs also take advice from Public Health England on potential health impacts of exposure to environmental pollution.

3 Landfill Design

The Landfill Directive provides certain technical Standards for landfill sites. More information can be found here: <https://www.gov.uk/government/publications/environmental-permitting-guidance-the-landfill-directive>

The Environment Agency has published landfill technical guidance that we expect operators to follow, in addition to the conditions set in their Environmental Permit. Technical guidance has also been published on waste acceptance, water monitoring, landfill Engineering, landfill gas and leachate treatment. More information can be found here:

<https://www.gov.uk/government/collections/environmental-permitting-landfill-sector-technical-guidance>

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Operators also have to use our published guidance notes for particular topics such as noise and odour. See link below

<https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management>

This guidance is common across all industry sectors.

How is the site engineered?

The site is engineered to ensure that the waste is contained in a low permeability liner to protect groundwater. The permit requires that construction proposals are submitted to us for approval, prior to construction. Engineered systems are in place to control and monitor leachate and landfill gas produced by the decomposition of waste. All of the engineering measures are rigorously tested and inspected to ensure their integrity. Construction Quality Assurance (CQA) validation reports are required for each new waste cell and no waste can be deposited until we have confirmed that we are satisfied with the CQA validation report.

What is capping, how is its effectiveness monitored and how long does it last?

The landfill directive refers to capping as the 'top sealing layer'. This layer prevents rainwater flowing into the site through the surface and prevents gas escaping. Capping is either a clay or welded plastic membrane with a topsoil layer. The design of a landfill cap must be submitted to the Environment Agency for approval before the construction work to create a landfill commences. We inspect the works to ensure the construction is completed to the required standards.

Environmental Permits for landfills include conditions requiring the site operator to undertake surveys of the site surfaces for fugitive emissions. If emissions are detected action will be required, this may include repairs to capping or changes to landfill gas management.

Capping is required to last for the life of the site and its integrity must be demonstrated as part of the process to surrender a landfill permit.

What waste can go into the landfill and who controls it?

The Environmental Permit for each landfill site lists the waste types and quantities that are permitted to be accepted. Landfill sites are only authorised to accept inert, non-hazardous or hazardous waste. For example if a landfill site is classified as inert, it can only accept inert waste. The Environment Agency has published guidance on Waste Acceptance Procedures, this includes criteria wastes have to comply with, based on the leachability of organic and inorganic components. This is explained further in the guidance at the link:

<https://www.gov.uk/government/publications/waste-acceptance-at-landfills>

<https://www.gov.uk/guidance/dispose-of-waste-to-landfill>

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Waste producers have a duty of care to ensure their waste is correctly described. Landfill operators have to follow waste acceptance procedures, which can include sampling to check that the waste being accepted at the landfill is the same as its description on paperwork and complies with the environmental permit.

What monitoring is undertaken on the site and why?

A landfill permit requires an array of monitoring points to be installed around and within the site to monitor emissions to groundwater, surface water and landfill gas. The Environmental Permit sets emission limits that are used to establish the impact on groundwater, surface water ground gases and emissions to air. For example for groundwater, monitoring is undertaken prior to waste being deposited to understand the “background” quality. This information is used to determine appropriate emission limits that will not cause deterioration to the quality. The permit also requires the monitoring of surface gas emissions. Monitoring data is required to be submitted to the Environment Agency and we must be informed immediately if the operator detects any emission limit being reached.

How is landfill gas managed at the site and how do you work out the volume being produced?

We use a gas model to predict the amount of landfill gas that will be produced, when it will be produced and at what rate. The model uses the tonnage and types of waste accepted at sites. Actual gas production rates are also monitored on site.

The figures produced by the model are reviewed against the actual rates of gas production to ensure adequate gas infrastructure is installed to manage the quantity of gas.

The Environmental Permit requires the operator to monitor the gas being produced on the site and around the perimeter, to ensure that landfill gas is not escaping

The landfill gas is collected from an array of gas wells that pipe the gas into a central gas control plant. The site may have a gas plant with a number of gas engines that are used to generate electricity, which is then sent to the national grid. There is also a backup flare used to treat excess gas, which can be operated if the engines are not available, for example when they are being serviced.

Is 'burning' the collected gas sufficient to neutralise all harmful parts of the gas?

The combustion of collected landfill gas has been industry best practice for many years. We ensure that flares or landfill gas power plants are operated to the correct standards. This guarantees effective combustion and the destruction of the trace gases.

There will be some exhaust gases released from the stack of the engine and flare, but the environmental permit includes limits to ensure these are at concentrations that are very unlikely to present a risk to people's health. The exhaust gas emissions are monitored by the operator and the results are reported to us.

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What is leachate and how is it managed?

As rain water percolates through the waste in the landfill, it dissolves a range of substances which then collect at the base of the landfill as a polluted liquid. This is known as leachate and it can contain high levels of contaminants, including ammonia. The level of leachate is required to be measured and sampled. The amount of leachate within the landfill is controlled by the environmental permit and any excess leachate has to be removed. Once the landfill cells are filled to capacity the operator is required to install an engineered cap over the top of the waste to reduce the amount of rainwater getting in, which limits the production of leachate.

Some landfill sites have a leachate treatment facility. Following treatment leachate will be either removed from site by tanker or discharged to the local water course or to sewer. Some sites do not have a treatment facility and leachate is collected in a storage tank and removed from site by tanker for treatment elsewhere.

What happens when the site stops taking waste?

Once a landfill site is full, it cannot accept any further waste and it is closed. However, the environmental permit conditions still require the permit holder (formerly the operator) to complete the monitoring required by the permit and demonstrate that no pollution is occurring. Our guidance works on the basis of the permit holder making financial provisions for landfill sites for at least 30 years after the site stops taking waste. We call this the aftercare period.

To remove the requirements of an Environmental Permit the operator has to apply to us to surrender the permit. To do this they need to demonstrate, using site monitoring data that the site no longer presents a significant risk of pollution or harm to human health. We would only accept a surrender application when this can be demonstrated.

Where does my waste go?

We believe that we need to create less waste, recycle more and dispose of the remainder in a safe and environmentally friendly way. We support the waste hierarchy as a general guide to selecting the best option for dealing with waste, which is 'reduce; re-use; recycle; recover; dispose'.

All waste producers have a duty to follow the waste hierarchy. This is not the responsibility of the landfill operator, other than for any waste they produce.

If you are interested in where your domestic waste is going please contact your waste collection authority.

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4. Traffic

Traffic movements are considered by the relevant County Council as part of the planning permissions for the sites. They do not form part of our Environmental Permit conditions.

The Landfill operator should use measures, such as a wheel wash to ensure the local highway is kept suitably clean. They may also use additional measures such as a road sweeper in the winter.

5. Miscellaneous controls

What measures are in place to control the seagulls?

Operators are asked to work towards preventing birds feeding on the landfill site. The control measures include covering the waste during and at the end of each day to reduce the 'food' available for birds scavenging on the landfill.

Measures to disperse gulls can also include the use of bangers and rockets. Operators can also employ a contractor to use birds of prey to deter seagulls from the tipping face.

What controls are in place to reduce litter and waste falling from vehicles going into the site?

Waste hauliers have a duty of care to ensure their loads are secure. If residents observe waste falling from a vehicle on the public highway please report this to us. Details of the waste company and vehicle registration number will assist in our investigations.

What measures are in place to control flies?

Operators are required to have site specific control measures in place to stop fly infestations. Contracts for spraying insecticide need to be flexible to allow for changes in treatment frequency, to take account for changes in weather conditions.

What measures are in place to control dust?

Any non-hazardous dusty waste should be handled separately to other wastes. It should be suitably packaged and covered immediately. Site roads within the landfill should be managed to prevent dust generation, and low traffic speeds on site should be enforced.

6. Public Register

Can Environment Agency permits, compliance information and monitoring data be put online for me to view?

Below is a link to what is required to be held on our public register under the Environmental Permitting Regulations 2010.

<http://www.legislation.gov.uk/ukxi/2010/675/schedule/24/made>

General public register information can be searched for on the Environment Agency webpage here: <https://environment.data.gov.uk/public-register/view/index>

The Environment Agency Compliance Assessment Reports and environmental monitoring reports that are provided by permitted sites are entered into our public register. This includes action plans which are required to be submitted under the requirements of the permit.

You can view our public register by calling 0208 474 7856 to make an appointment or you can email us at Enquiries_WestMids@environment-agency.gov.uk to request public register information.

7. Who to Contact

Should you have concerns with regards to odour outside of the site boundary, pests or any other pollution matters relating to the sites please call our **Environment Agency Incident Hotline on 0800 80 70 60** (24 hours a day, seven days a week).

For any other queries please contact our Customers and Engagement team by emailing Engagement_WestMids@environment-agency.gov.uk.

Any press enquiries should be directed to our press team on 0800 917 9258. (24 hours a day, seven days a week).

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