

## Landfill gas – methane

Issued 11 April 2019

*EPA 1111/19: This information sheet provides general information on landfill gas, which is regulated by the Environment Protection Authority. The most common component of landfill gas is methane and carbon dioxide, with trace components comprising the rest.*

### What is methane

Methane is a naturally occurring gas which is present at low concentrations as a component of the earth's atmosphere. We inhale methane along with other atmospheric gases such as nitrogen and oxygen when we breathe. Methane (CH<sub>4</sub>) is an odourless and colourless flammable gas composed of carbon and hydrogen, and is used in making other chemicals.

Natural sources of methane include swamps and wetlands. Methane is the major component of natural gas, which is formed when natural organic matter is compressed under the earth at very high pressure and temperatures, typically over 10s of millions of years. This methane is typically trapped deep underground.

Methane is also produced as a byproduct of the digestive processes of animals such as cattle, sheep and goats. Some human activities, for example the dumping of waste containing organic matter to landfills, also contributes to the production or release of methane into the atmosphere.

### Methane from landfills

Methane can be formed from biological processes that occur when micro-organisms chemically break down organic matter in the absence of oxygen. This is the type of methane production that commonly occurs in landfills.

Landfill gas is typically made up of 99% methane and carbon dioxide. The remainder is made up of trace components such as hydrogen sulfide. After closure, a landfill can continue to produce gases for more than 50 years<sup>1</sup>.

Not all landfills generate gas however, it is only applicable to landfills which receive organic matter. Landfills receiving only construction and demolition waste that is made up of inert materials such as concrete, brick and wood, do not produce gas.

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<sup>1</sup> Victorian Environment Protection Authority 2012, [Landfill gas publication 1479](#).

## When methane becomes hazardous

When a landfill is closed, gases including methane continue to be produced for a number of years. If appropriate measures to control the pressure of these gases are not in place, landfill gases can build up in the soil. In these situations methane may migrate laterally through the soil outside of the landfill site boundaries.

Methane can intrude into buildings and confined spaces such as service pits or underfloor boards. When this happens methane becomes more hazardous as its concentration builds up over time.

When methane concentrations comprise between 5–15% of the air, it has the ability to combust. If an ignition source is introduced and the right amount of oxygen is present then methane may become flammable.

At high concentrations landfill gas including methane and carbon dioxide, can displace oxygen. This may pose an asphyxiation hazard, causing symptoms such as agitation, slurred speech, nausea, vomiting and headaches.

## Control and regulation of landfill gases including methane

There are a number of means of controlling landfill gas movement. These include venting and extracting gas at the landfill site. Monitoring of landfill gas is important to understand if the control measures are working effectively.

Maintaining a buffer distance between the landfill and neighbouring developments is also an effective risk management measure as landfill gas only presents a risk when it accumulates at high concentrations at or near the site.

If a development is undertaken within 500 m of a landfill (even if adjacent to an existing development), the operator/owner and the developer may have responsibilities to undertake a risk assessment. The operator/owner is likely to be required to control the landfill gas at the source, and the developer may have to change development plans so that a risk is not created<sup>2</sup>. The land close to a landfill may be suitable for other purposes such as open recreation.

Modern landfills are appropriately designed and engineered with reliable landfill gas control measures to meet EPA standards, and the EPA requires landfill licensees or site owners to take action to assess and manage landfill gas. The EPA requires all new landfills to have a 500-m buffer under the control of the licensee so that development cannot occur in the buffer zone. The EPA can also impose requirements through site contamination assessment orders and site contamination remediation orders under sections 103H and 103J of the *Environment Protection Act 1993*.

Some older landfills were engineered to lower standards, as landfill gas was less well understood at the time of construction or landfill closure. There are also historical landfills which pre-date the establishment of the EPA and were never licenced, and do not necessarily have records of their existence retained by planning authorities. Development near to current and historic landfill sites may be impacted by the risks from landfill gas. It is preferable to address landfill risks at the earliest stages of planning policy development.

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## Further information

### Legislation

[Online legislation](#) is freely available. Copies of legislation are available for purchase from:

Service SA Government Legislation Outlet  
Adelaide Service SA Centre  
108 North Terrace  
Adelaide SA 5000

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<sup>2</sup> EPA 2012, [Landfill gas and development near landfills – advice for planning authorities and developers](#).

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## General information

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