

MERCAPTAN, ODOUR AND H₂S AT THE KMA WELL SITE

Third Energy is aware that hydrocarbon smells or odours can occasionally be detected near the KMA well site and that the odour can cause concern to local residents. The aim of this fact sheet is to explain the source of the odour and to provide reassurance to residents that it is associated with occasional, planned maintenance operations and not, as some people believe, a gas leak.

The source of the odour is a group of chemicals called mercaptans. Mercaptans are naturally present in condensing compounds, often present in natural gas, and have a distinct smell.

It is occasionally confused with the smell of hydrogen sulphide (H₂S), also associated with natural gas production. Both substances contain sulphur molecules which create distinct odours.

Mercaptans

Mercaptans, or Thiols, are organo-sulphur compounds with a strong odour of garlic or rotten eggs. The chemical formula varies for different types but, in broad terms, a sulphur molecule becomes linked to a hydrocarbon molecule. In low concentrations they are harmless, but distinctive.

In unrefined oil and gas, mercaptans tend to accumulate in gas condensates i.e. the heavier, longer-chain, liquid hydrocarbons that form in natural gas under certain conditions. Consumers will be familiar with liquid gas as butane in lighters or propane in patio gas canisters.

At surface, gas from the Kirkham Abbey Formation (KAF) reservoir, which is mainly methane, contains a small proportion of condensate which contains mercaptans. This condensate needs to be separated from the methane and other lighter gases used to generate electricity at Knapton.

The gas and liquids from the Pickering wells are brought by pipeline to the separation equipment on the lower half of the KMA well site. The lighter gases are separated from the condensate before the gas is sent to Knapton by pipeline. From time to time it is necessary to open the gas separation equipment for inspection, cleaning and maintenance. When the vessel is open to the atmosphere it is possible to detect a mercaptan odour. This happened when the test separator was cleaned in March 2017 and the wind pushed the odour from the well site towards the village.

Mercaptan odour can also be quite persistent. For example, when Third Energy operators have been exposed to mercaptans at site it can cling to their overalls, smelt in their vehicles and sometimes still be lingering when they return to the Knapton Generating Station.

H₂S

H₂S is a gas and is present in extremely low concentrations in the natural gas produced from the KAF reservoir in the Vale of Pickering. This is why the gas is classified as slightly sour and, although the concentration is low, precautionary measures are in place at the well sites and the Knapton Generating Station to detect H₂S. Operators wear H₂S monitors and there are H₂S monitors and alarms on site to give early warning in the unlikely event of a leak.

The H₂S does not exist in isolation from the natural gas production. It would be incorrect to say that there had been "a leak of H₂S" from our sites as it is never separated from the rest of the natural gas. Because methane is odourless, only the H₂S can be smelt.

There is no production of gas from any of the wells on the KMA site and the KM8 well has not yet been perforated. Therefore it is extremely unlikely that residents could smell gas from the wells on site. However, gas production from the Pickering wells does come through the site.

The olfactory limit for H₂S (the concentration at which a substance is detectable to humans) is between 0.02 and 0.13 ppm and quickly disperses into the atmosphere. The exposure risk is higher in enclosed spaces than open spaces such as a well site.

Adding odours to natural gas

The conditioned gas which is sent by the grid to UK homes is mainly methane. For safety reasons, as methane is odourless, an odorant is added to the gas before it is put in the grid. As Mercaptans are extremely odorous even in low concentrations they are used as the odorant in the gas. Consumers instantly recognise the strong and persistent “gassy” smell that alerts them to gas either from unlit appliances in their home or to a leak.

Third Energy does not add any odours to its gas production at any point.

Summary

The harmless but distinct odour of mercaptan may occasionally be smelt in Kirby Misperton village. When maintenance operations on the well sites are planned that might lead to an odour, Third Energy will let the village know in advance.

A mercaptan odour is not the same thing as a leak of natural gas.

There is no gas currently produced from wells on the KMA site.

Reporting Odours and suspected gas leaks

The very strict and established regulatory regimes that cover our operations – both conventional and unconventional gas - clearly distinguish between odours that cause a nuisance, such as from Mercaptans, and gas leaks with the potential to impact health and safety.

If local residents have any concerns about an odour they should contact the Knapton Generating Station on 01944 758 746 immediately so the cause can be investigated and, if necessary, any remedial action taken without delay.